



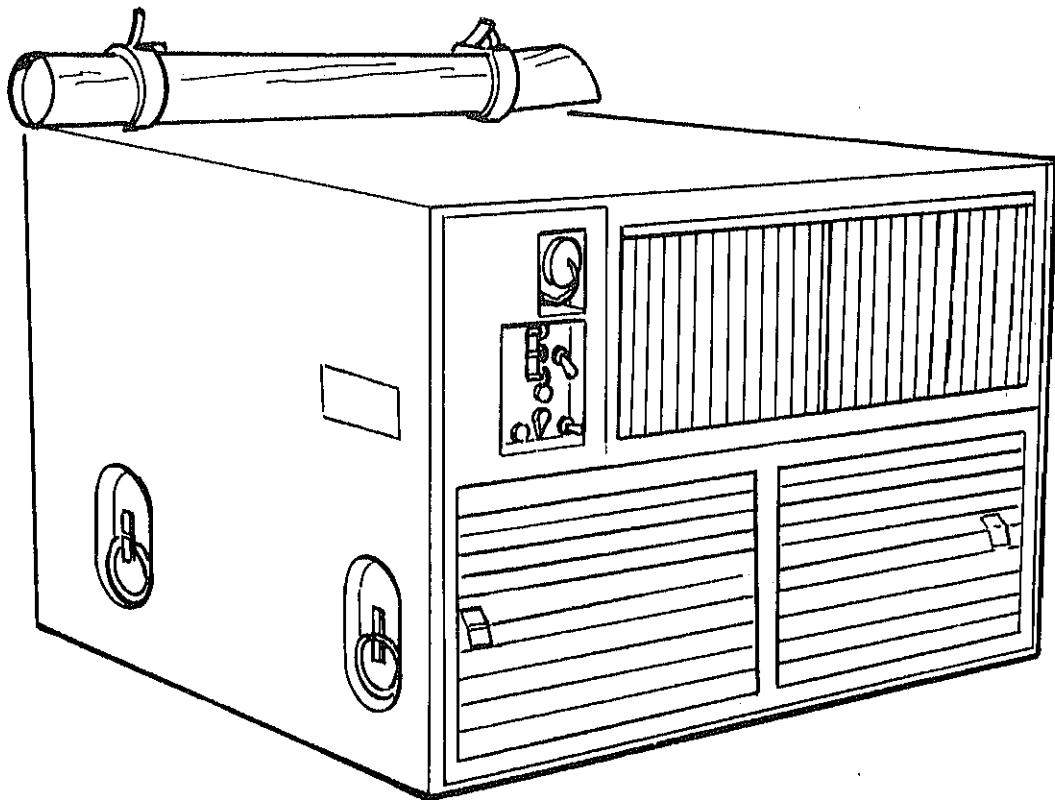
**TECHNICAL MANUAL**

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT & GENERAL SUPPORT**

**MAINTENANCE MANUAL**

**FOR**

**CONDITIONER, HORIZONTAL, COMPACT, 36000 BTU**



**208 VOLT, 3 PHASE 400 HERTZ**

**NSN 4120-00-063-8182**

**AMERICAN AIR FILTER CO. MODEL CH436-1  
AND**

**208 VOLT, 3 PHASE, 50/60 HERTZ**

**NSN 4120-00-063-7575**

**AMERICAN AIR FILTER CO. MODEL CH636-1**



Operator, Organizational,  
Direct Support and General Support  
Maintenance Manual

AIR CONDITIONER, HORIZONTAL, COMPACT, 36,000 BTUH  
208 VOLT, 3 PHASE, 400 HERTZ  
NSN: 4120-01-063-8182  
(AMERICAN AIR FILTER CO., MODEL CH436-1)  
208 VOLT, 3 PHASE, 50/60 HERTZ  
NSN: 4120-01-063-7573  
(AMERICAN AIR FILTER CO., MODEL CH636-1)

TM 5-4120-361-14, 30 May 1980, is changed as follows:

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2. Remove and insert pages as indicated below. New or changed text material indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

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i and ii

Insert pages

i and ii

3. Retain this sheet in front of manual for reference purposes.

Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.  
*General, United States Army*  
*Chief of Staff*

Official:

R. L. DILWORTH  
*Brigadier General, United States Army*  
*The Adjutant General*

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**DEATH ON CONTACT**

or severe injury may result if personnel fail  
to observe safety precautions.

Always disconnect the air conditioner from  
power source before performing maintenance  
on this equipment.

If power must remain on for troubleshooting,  
exercise extreme care to avoid contact with  
any electrical component, fan, fan motor, etc.

Do not operate the air conditioner without  
louvers, top covers, and guards in place and  
tightly secured.

**WARNING**

**REFRIGERANT UNDER PRESSURE**  
is used in the operation of this equipment

**DEATH**

or severe injury may result if personnel fail  
to observe safety precautions.

Never use a heating torch on any part  
that contains refrigerant-22.

Avoid bodily contact with liquid refrigerant  
and avoid inhaling refrigerant gas.

**WARNING**

The burning of polyurethane foams is dangerous.  
Due to the chemical composition of a polyurethane foam,  
toxic fumes are released when it is burned or heated.

If it is burned or heated indoors,  
such as during a welding operation in its proximity,  
precautions should be taken to adequately ventilate the area.

An exhaust system equivalent to that of a  
paint spray booth should be used.

Air supplied respirators, approved by the  
National Institute for Occupational Safety and Health  
or the US Bureau of Mines,  
should be used for all welding in confined spaces  
and when ventilation is inadequate.

Individuals who have chronic or recurrent respiratory  
conditions, including allergies and asthma,  
should not be employed in this type of environment.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts,  
is potentially dangerous to personnel and property.

Avoid repeated and prolonged skin contact.

Do not use near open flame or excessive heat.

Flash point of solvent is 100° -138°F (38° -59°C).



AIR CONDITIONER, HORIZONTAL, COMPACT, 36,000 BTUH

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(AMERICAN AIR FILTER CO., MODEL CH436-1)

208 VOLT, 3 PHASE, 50/60 HERTZ

NSN 4120-01-063-7573

(AMERICAN AIR FILTER CO., MODEL CH636-1)

## REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63123. A reply will be furnished directly to you.

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## Section I. GENERAL INFORMATION

### Scope.

This manual is for your use in operating and maintaining the AAF Models 6-1 and CH636-1 air conditioners.

### Maintenance Forms and Records.

Maintenance forms and records that are required to use are explained in 8-750.

### 1-3. Reporting of Equipment Improvements Recommendations.

EIR can and must be submitted by anyone who is aware of any unsatisfactory condition with the equipment design or use. It is not necessary to show a design or list a better way to perform procedure, just simply to tell why the design is unfavorable or why a procedure is difficult. EIR may be submitted on

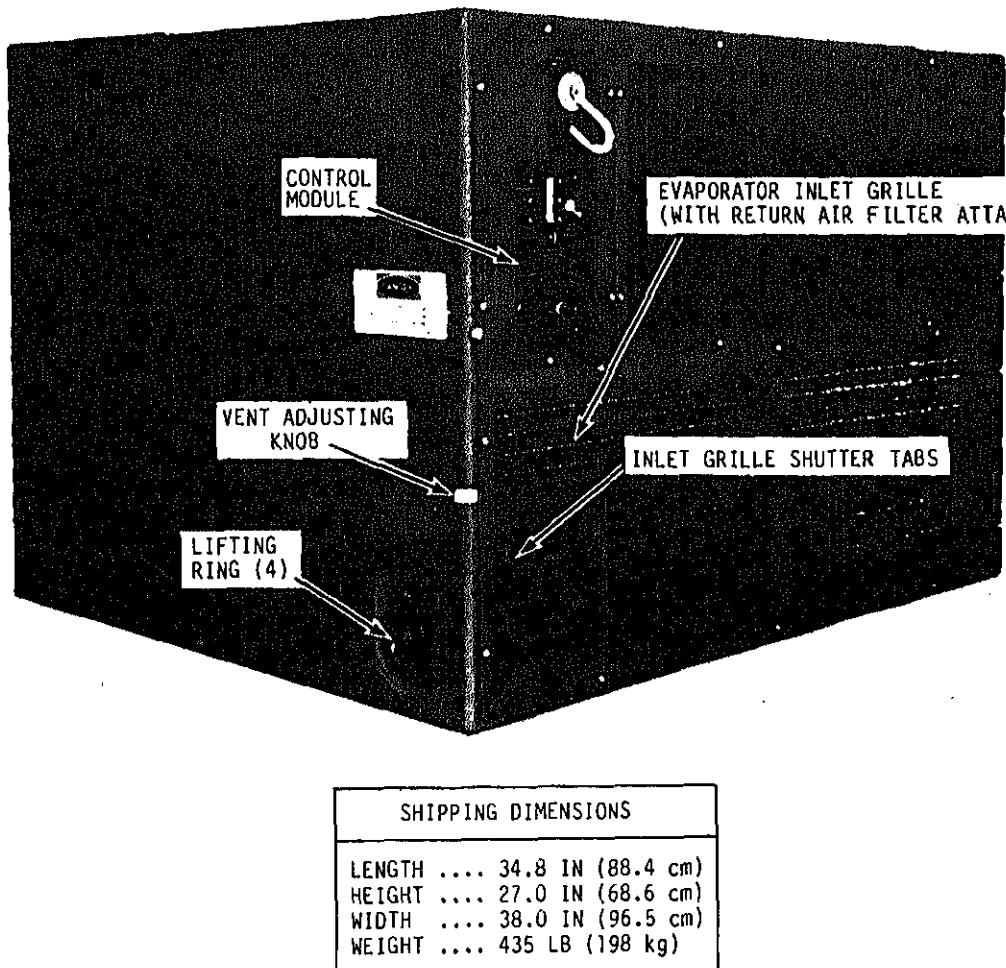


Figure 1-1. Air conditioner, right front, three quarter view, with shipping dimensions

368 (Quality Deficiency Report). Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Managements System. Mail directly to Commander Headquarters, U. S. Army Troop Support and Aviation Material Command, ATTN: DRSTS-MEM, 4300 Goodfellow

Bvd., St. Louis, MO 63120. A reply will be forwarded directly to you.

#### 1-4. Equipment and Serviceability Criteria.

This equipment is not covered by a ECS.

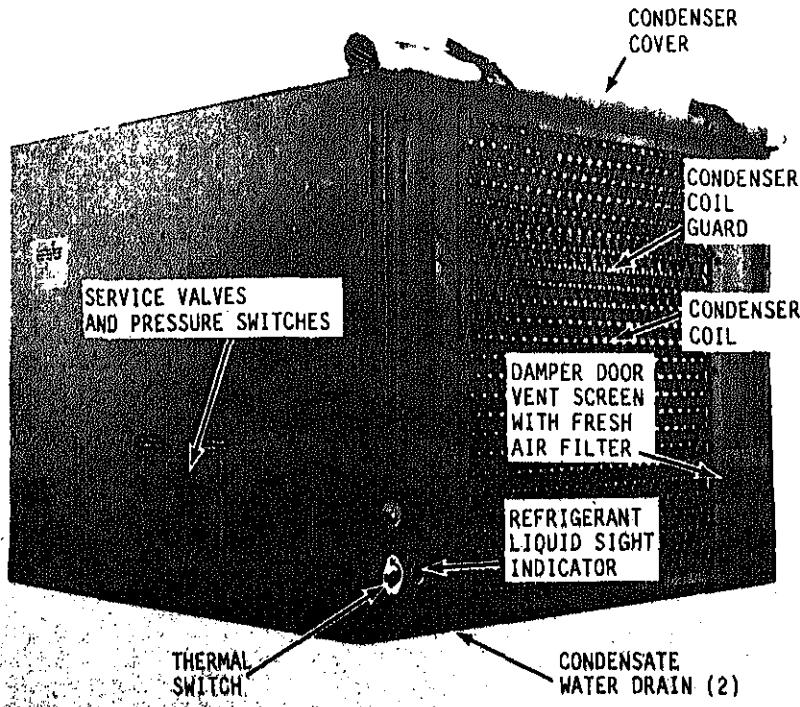


Figure 1-2. Air conditioner left rear, three quarters view

#### Section II. EQUIPMENT DESCRIPTION

##### 1-5. Equipment Purpose, Capabilities and Features.

Air conditioner Model CH436-1 or CH636-1 (figures 1-1 and 1-2) is a completely self-contained, compact, horizontal unit designed for cooling and heating air to a desired predetermined range, and circulating the conditioned air to provide heating or cooling of equipment or personnel within the air-conditioned area. It is designed for continuous operation, with varying loads. It is used primarily in van type enclosures to provide the filtered cooling and ventilating or heated air required to maintain service conditions necessary for efficient operation of electronic equipment and the comfort of operating personnel. It is equipped

with internal ducting so that ventilation air may be drawn into the area being air conditioned. The evaporator condenser sections of the air conditioner are separated by an insulated metal partition that forms part of the unit housing.

##### 1-6. Location and Description of Major Components.

a. Evaporator Section. The evaporator section (fig. 1-3), located in front of the air conditioner, contains intake and discharge air louvers, air filter, mist eliminator, evaporator coil, evaporator motor and fans, heat elements, heater thermal protector, many expansion valve, condensate drain

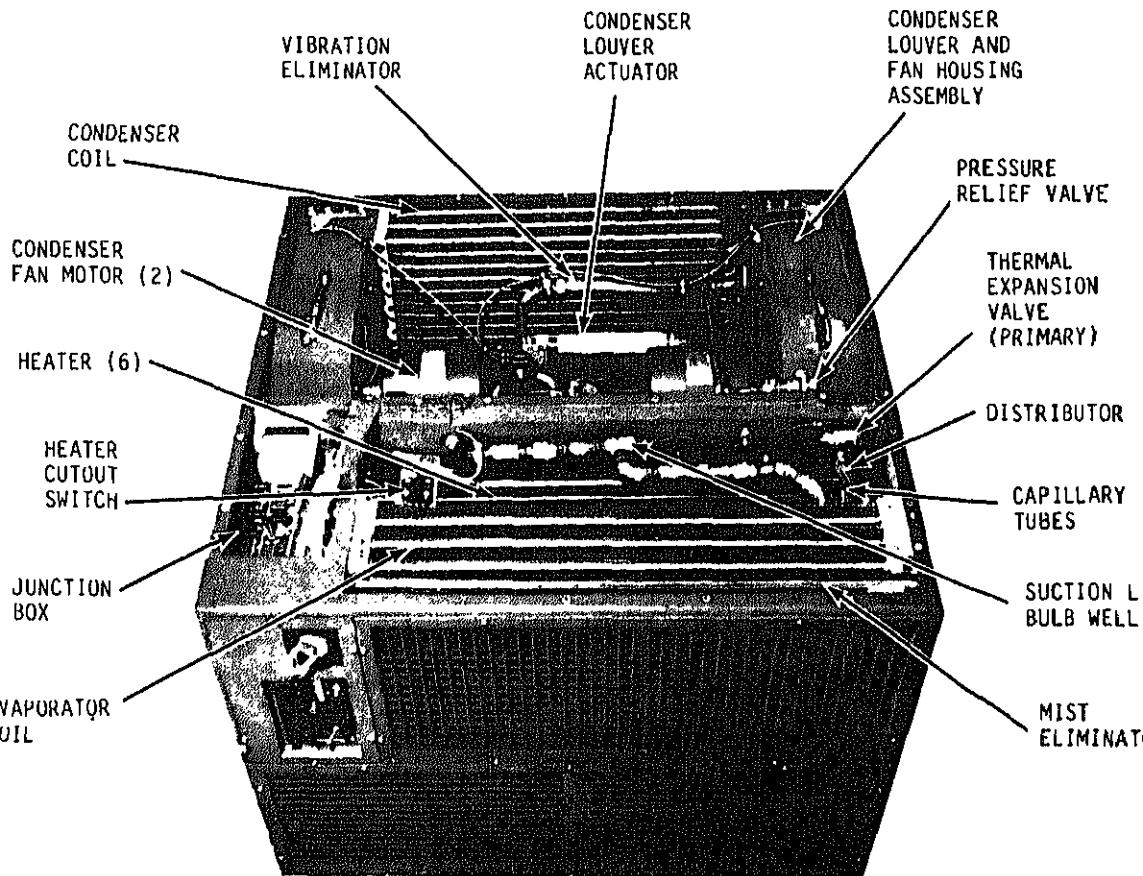


Figure 1-3. Air conditioner top view, top covers removed

s, electrical control panel and con-  
s, main input power connector, con-  
module, and the ventilation air  
er door and control knob. The evap-  
or fan draws air into the unit, from  
space being conditioned, through the  
t louver and air conditioning fil-  
or when required, from the outside  
the unit, through the fresh air fil-  
and ventilation duct; air is then  
ed over the heater elements through  
orator coil, mist eliminator and  
et louver. The outlet louver has  
stable blades for directing the air  
into a desired pattern within the  
e being conditioned. The evaporator  
speed is controlled by a toggle  
ch on the control module.

Condenser Section. The condenser  
ion (fig. 1-3) located in the rear

part of the air conditioner contains  
condenser coil, condenser coil guard,  
two condenser motors and fans, motor  
compressor, condenser fan housings and  
louvers, louver actuator, ventilation  
air duct, fresh air filter and vent  
screen, thermal switch, refrigerant  
liquid sight indicator, solenoid valve,  
expansion quench valve, discharge bypass  
regulation valve, pressure relief valve,  
system access service valves, filter-  
drier, refrigerant liquid receiver, ac-  
cumulator, associated electrical wiring  
and refrigerant tubing and an alterna-  
power input connector. The condenser  
fan speed is controlled by a thermal  
switch located on rear of unit. At a  
bient temperatures of  $100^{\circ}\text{F} +5^{\circ}\text{F}$  ( $38^{\circ}\text{C} +3^{\circ}\text{C}$ ) or higher, the condenser fan  
motors will operate at high speed (3000  
RPM); and at ambient temperatures be-  
low  $100^{\circ}\text{F}$  ( $38^{\circ}\text{C}$ ), the motor will operate

drops below the 100°F (38°C) changeover point.

## 1-7. Difference Between Models.

This manual covers the following two models.

(1) AAF Model CH436-1 which operates on 208-volt, 3-phase, 400-Hertz ac power

(2) AAF Model CH636-1 which operates on 208-volt, 3-phase, 50-60 Hertz ac power

In this manual, difference in models is identified by reference to the operating frequency, that is, either as the 400-Hertz model or the 60-Hertz model.

## 1-8. Performance Data.

The following listing contains the performance and dimensional data applicable to the air conditioner.

(1) Air conditioner, models CH436-1 and CH636-1:

Nomenclature . . . . Air conditioner, horizontal, compact

Cooling . . . .	36,000 BTU/hr
Heating:	
High . . . .	35,600 BTU/hr
Low . . . .	20,400 BTU/hr
Ventilation. .	1285 CFM
Phase . . . .	3
Hertz . . . .	400 (Model CH436-1) 50/60 (Model CH636-1)
AC volts . . . .	208
Current input, full load, amperes	
Cooling . . . .	28.5
High heat . . . .	31
Low heat . . . .	15.5
Ventilating. . . .	3.2
Refrigerant. . . .	R22

### (2) Dimensions and weights:

Length . . . .	34.8 in. (88.4 cm)
Height . . . .	27.0 in. (68.6 cm)
Width . . . .	38.0 in. (96.5 cm)
Weight . . . .	435 lbs (198 kg)

## Section III. TECHNICAL PRINCIPLES OF OPERATION

1-9. Refer to paragraphs 1-5 and 1-6 for a description of the functions performed by the air conditioner and identification of the components that perform the various functions. Refer to paragraph 2-2 for a description of the

various controls available to the operator. Refer to figure 1-4 for the electrical schematic and figure 1-5 for wiring diagram of the air conditioner electrical system.

Index, Figures 1-4 and 1-5.

### DESCRIPTION

#### COMPRESSOR

MOTOR, CONDENSER FAN

MOTOR, EVAPORATOR FAN

MOTOR, CONDENSER FAN

REF DESIG	PART NUMBER	DESCRIPTION
C1	M39014/05-2461	CAPACITOR, FILTER
CB1	D13216E6205	CIRCUIT BREAKER, COMPRESSOR
CB2	C13216E6178	CIRCUIT BREAKER, CONTROL
CB1	D13216E6223	RECTIFIER, SEMICONDUCTOR DEVICE
E1	MS24693-S74	TERMINAL STUD (JUNCTION BOX GRD)
E2	MS24693-S50	TERMINAL STUD (CONTROL MODULE GRD)
E3	MS35206-266	TERMINAL STUD (SYSTEM GRD)
R1 THRU 6	C13216E6124-5	HEATER ELEMENT
H1R7	PART OF D13216E6309	COMPRESSOR, HEATER
J1	MS3100R-24-22P	CONNECTOR, RECEPTACLE, POWER INPUT
J2	D13216E6177	CONNECTOR, RECEPTACLE, JUNCTION BOX
J3	D13216E6193-2	CONNECTOR, RECEPTACLE, EVAPORATOR FAN
J4	D13216E6193-2	CONNECTOR, RECEPTACLE, CONDENSER FAN
J5	D13216E6193-2	CONNECTOR, RECEPTACLE, CONDENSER FAN
J6	PART OF D13216E6309	CONNECTOR, RECEPTACLE, COMPRESSOR
J7	D13216E6193-6	CONNECTOR, RECEPTACLE, COMPRESSOR
J8	D13216E6193-1	CONNECTOR, RECEPTACLE, SOLENOID BY-PASS
J9	D13216E6193-4	CONNECTOR, RECEPTACLE
J10	D13216E6193-1	THERMOSTATIC SWITCH
		CONNECTOR, RECEPTACLE
		SOLENOID VALVE EQUALIZER
J11	D13216E6193-7	CONNECTOR, RECEPTACLE, AUX POWER INPUT
J12	MS3100R-24-22P	CONNECTOR, RECEPTACLE, AUX POWER INPUT
K1	C13216E6182	RELAY, TIME DELAY
K2	MS24192-D1	RELAY, HEATER
K3	MS24193-D1	RELAY, COMPRESSOR
K4	C13216E6458	RELAY, CONDENSER FAN
K5	C13216E6458	RELAY, CONDENSER FAN
TB4	D13219E9555-2-8	TERMINAL BOARD
K7	MS24192-D1	RELAY, EVAPORATOR FAN
K8	MS24192-D1	RELAY, EVAPORATOR FAN
K9	MS24192-D1	RELAY, HEATER
L1	C13216E6158	VALVE, SOLENOID, BY-PASS
L2	C13216E6158	VALVE, SOLENOID, PRESSURE EQUALIZER
P1	MS3106R-24-22S	CONNECTOR, PLUG, POWER INPUT
P2	D13216E6209-3	CONNECTOR, PLUG, CONTROL MODULE
P3	PART OF D13216E6451	CONNECTOR, PLUG, EVAPORATOR FAN
P4	PART OF D13216E6140	CONNECTOR, PLUG, CONDENSER FAN
P5	PART OF D13216E6140	CONNECTOR, PLUG, CONDENSER FAN
P6	MS3106R-24-11S	CONNECTOR, PLUG, COMPRESSOR
P7	MS3106R-24-11P	CONNECTOR, PLUG, COMPRESSOR
P8	B13216E6173	CONNECTOR, PLUG, SOLENOID VALVE BY-PASS
P9	MS3106R-16-10P	CONNECTOR, PLUG, THERMOSTATIC SWITCH
P10	B13216E6173	CONNECTOR, PLUG, SOLENOID VALVE EQL
P11	MS3106R-24-10S	CONNECTOR, PLUG, AUX POWER INPUT
R1	B13220E6838	RESISTOR
S1	D13216E6201	SWITCH, ROTARY SELECTOR
S2	MS35058-23	SWITCH, TOGGLE
S3	D13216E6203-2	SWITCH, TEMPERATURE CONTROL
S4	C13216E6215-3	SWITCH, HIGH PRESSURE CUTOFF
S5	C13216E6215-1	SWITCH, LOW PRESSURE CUTOFF
S6	C13216E6224	SWITCH, HEATER CUTOFF
S8	C13216E6460	SWITCH, THERMOSTAT
S9	PART OF D13216E6309	COMPRESSOR, THERMAL CUTOFF SWITCH
T1	C13216E6214	TRANSFORMER
TB1	C13216E6464	TERMINAL BOARD, POWER INPUT
TB2	C13216E6220-3	TERMINAL BOARD
TB3	C13216E6232	TERMINAL BOARD, JUNCTION BOX

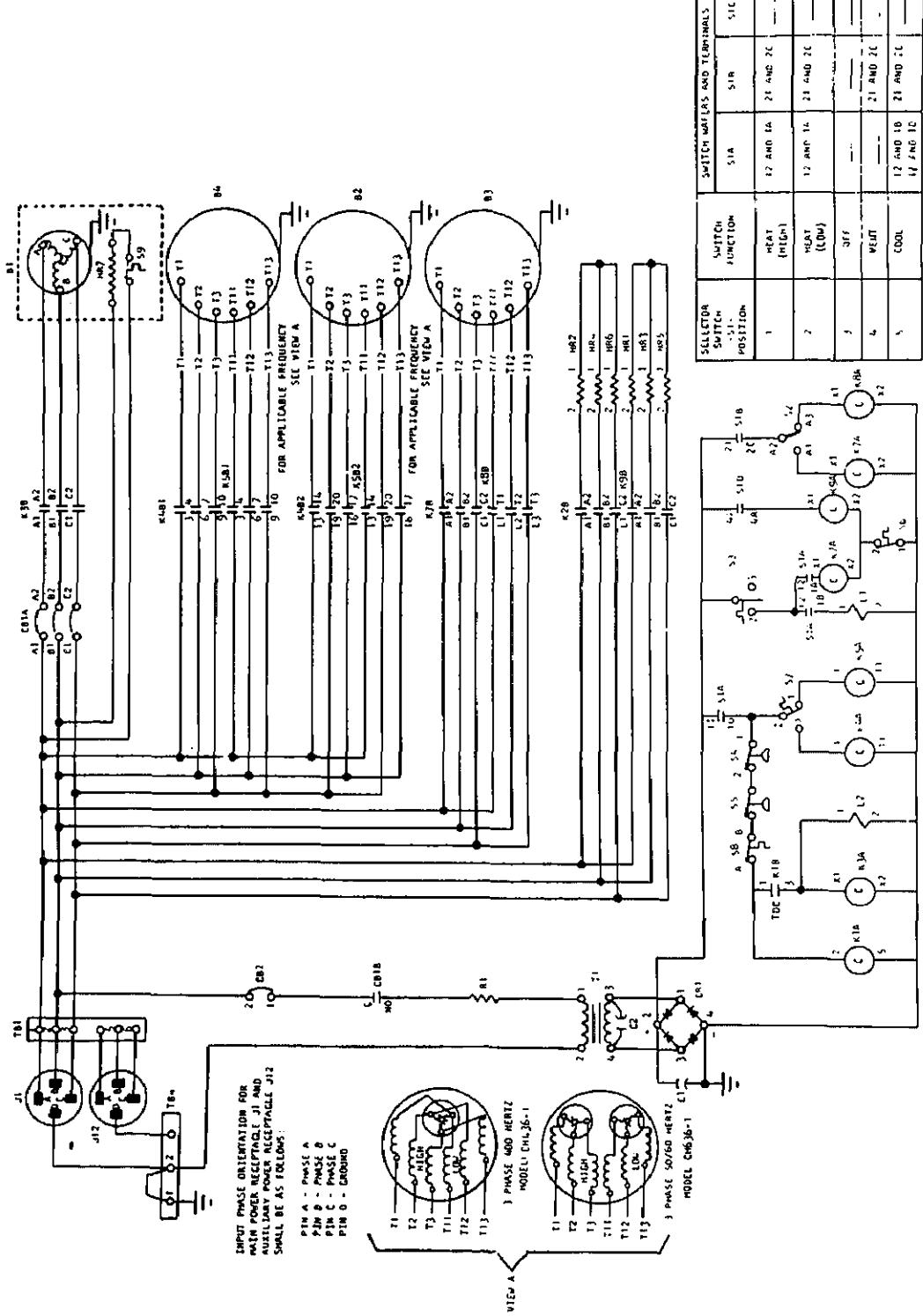


Figure 1-4. Control system schematic diagram

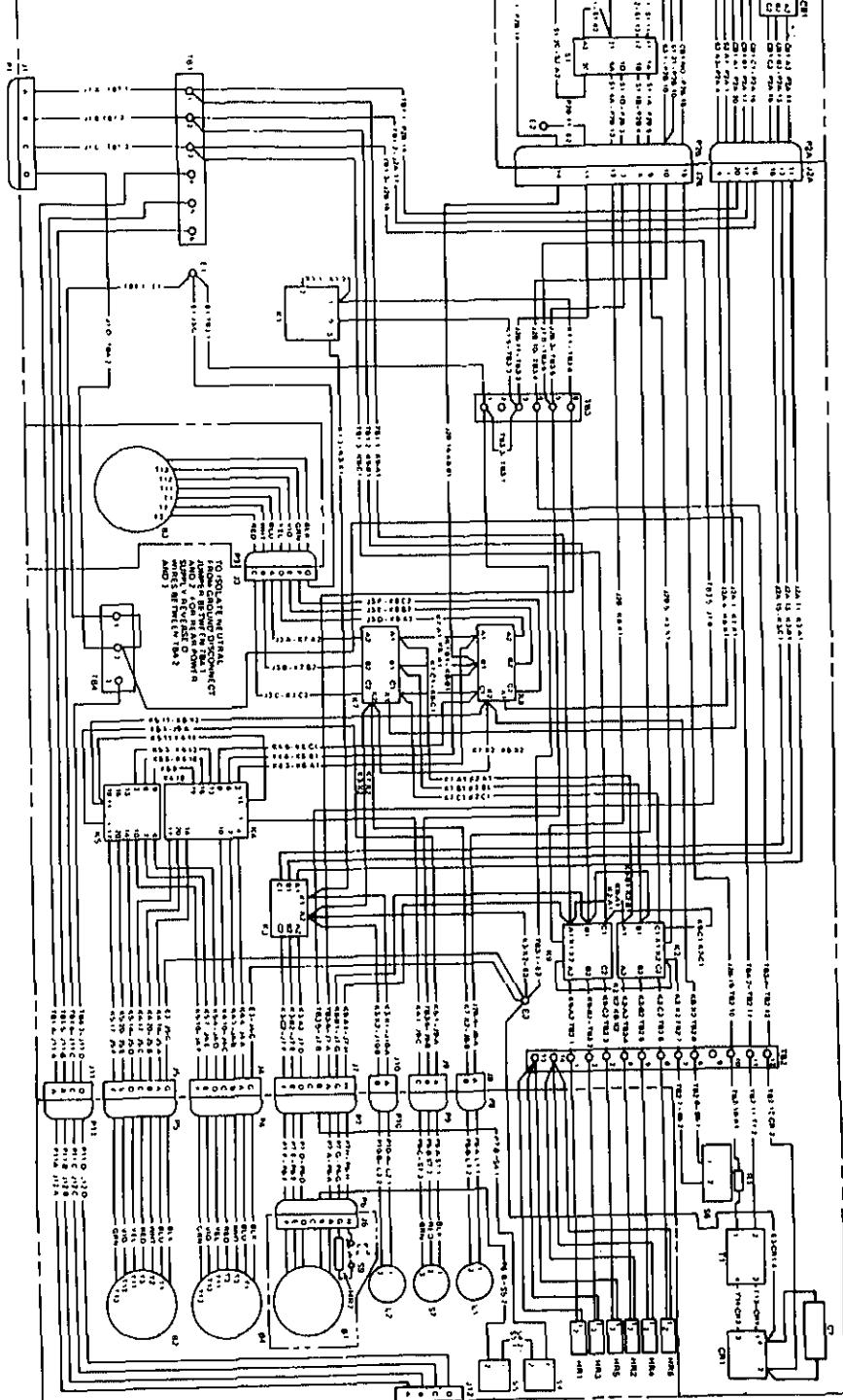


Figure 1-5. Wiring diagram



**CAUTION**

If equipment fails to operate refer to troubleshooting procedures in chapter 3.

## Section I. CONTROLS AND INSTRUMENTS.

### . General.

This section describes, locates and illustrates the various controls and provides the operator/crew sufficient information to insure proper operation of the air conditioner.

### . Controls and Instruments.

a. General. The location and the function of the controls and instruments are illustrated in figure 2-1. The control module contains the control circuit breaker, the manually operated temperature selector switch, mode selector switch, evaporator fan speed switch and compressor circuit breaker. The control module is designed to permit remote control operation of the air conditioner when connected with a remote control cable. The thermostatic control point for the air temperature is determined by the location of the temperature selector switch sensing bulb. Normally, the air conditioner is operated with the control module remaining on the unit and the sensing bulb of temperature selector switch located in the inlet air stream inside the unit evaporator section.

b. Temperature Selector Switch. The temperature selector switch is a thermostatic switch which responds to temperature variations from 60°F in the maximum cooler position to 90°F (15.6°C to 32°C) in maximum warmer position. The first preliminary adjustment of the temperature selector is midway between the cooler and warmer positions, corresponding to approximately 75°F (24°C). A 5 minute period should be allowed between adjustments of the temperature selector for the full effect of the adjustment to be realized. Once the desired temperature of the air conditioner is obtained, no further adjustment is required for either cooling or heating modes of operation.

c. Mode Selector Switch. The mode selector switch is an electrical switch that can be manually positioned to select the desired operational mode of the air conditioner. The five positions the mode selector are:

(1) Off. The off mode position used to stop operation. All major electrical components are isolated from electrical power except the compressor crankcase heater, which is thermostatically controlled as long as input power is connected to the unit.

(2) Vent. In the vent mode position, the evaporator motor operates the fans circulate filtered air. Ventilation air will be drawn into the unit through the fresh air filter and ventilation duct if the damper door in the vent is open. Some cooling effect will occur if the ventilation air is cold. Ventilation air flow is controlled by opening and closing the damper door with the vent adjusting knob.

(3) Cooler. In the cooler mode position, the refrigerant cycle begins and the unit will cool under the thermostatic control of the temperature selector switch. The evaporator fan motor, condenser fan motors and compressor are activated and will operate continuously. The speed of the evaporator fan motor is controlled by manually selecting the desired speed position of the evaporator fan speed switch. The speed of condenser fan motors is automatically controlled by an outdoor thermal switch. The motors will operate in low speed when ambient temperature is below 10°C (38°F). The thermal switch automatically switches the motors to high speed if ambient temperature rises above 10°C (38°F). To prevent starting surge current of the compressor coinciding with the starting surge current of the fan motors, the compressor starts about

continuously in this mode, the thermostatic action of the temperature selector switch causes refrigerant to bypass the evaporator coil and stop cooling when the desired temperature setting of the temperature selector switch is satisfied. Ventilation air will be drawn into the unit if the vent damper door is open.

(4) Low Heat. In the low heat mode, the evaporator fan motor operates continuously and three of the six heater elements are activated. The three heater elements cycle on and off under thermostatic control of the temperature selector switch. This mode will produce half of the unit's heating capability. Ventilation air will be drawn into the unit if the vent damper door is open.

(5) High Heat. In the high heat mode, the evaporator fan motor operates continuously and all six of the heater elements are activated, but only three of the heater elements will cycle on and off under thermostatic control of the temperature selector switch. This mode will produce maximum heating capability of the unit. Ventilation air will be drawn into the unit if the vent damper door is open.

d. Evaporator Fan Speed Switch. The evaporator fan speed switch has two positions, "low" and "high." The positions are manually selected to control the evaporator fan speed in all operating modes. Normally the "low" speed should be selected as it is quieter and requires less electrical power; however, the "high" speed position has three advantages over "low" which may dictate its selection:

(1) Maximum cooling capacity can only be achieved in "high."

(2) The increased flow of evaporator air improves air distribution in the conditioned space.

(3) Twice as much ventilation air is drawn into the unit in "high."

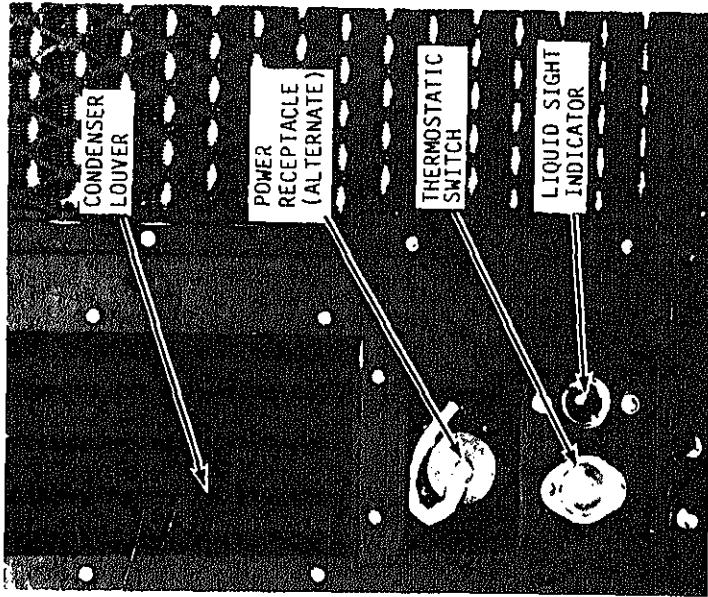
e. Vent Adjusting Knob. The vent adjusting knob controls the flow of ventilation air into the unit. The knob is connected by the damper cable to a damper located in the vent duct. The knob controls the flow of ventilation air by adjusting the position of the damper

turning the knob to the left opens the damper. The force that draws ventilation air into the unit is the small pressure difference between the ambient and the evaporator fan. This is the same small pressure difference that exists between the conditioned space and the evaporator fan; the pressure difference that draws return air through the inlet louver and the return air filter. When ventilation air enters the conditioned space a like flow of air must exhaust from the space to prevent a pressure buildup. Cracks in the space must be sufficient; but if a large flow of ventilation air is desired, some positive means of air exhaust should be provided.

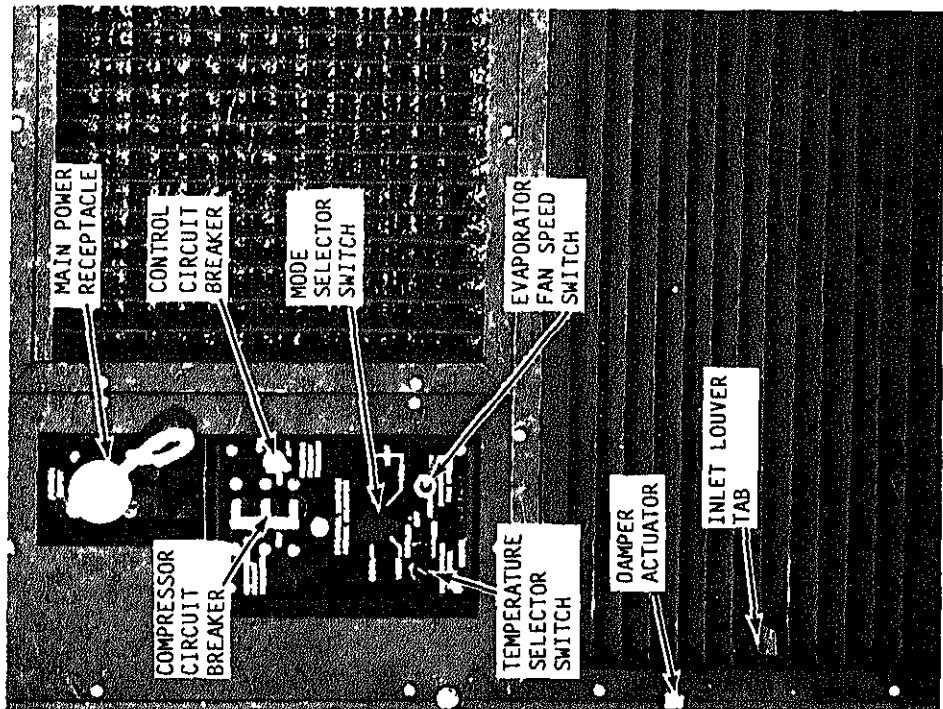
f. Inlet Louver. The inlet louver is finger-adjustable from full open to full closed. Normally the louver shifter tab adjustment is kept at 45° position, which is essentially the same as full open inlet louver. If the inlet louver is closed, return air will still manage to flow through it; but at a reduced rate with high pressure drop. Increase in pressure drop will cause additional ventilation air to be drawn into the unit. The "vent" mode of operation is normally the only mode where closing the inlet louver (to create increased ventilation airflow) would be considered a real advantage. Sufficient ventilation air flow for other modes of operation can be achieved with the inlet louver open and the damper open. The return air filter is attached to the back side of the inlet louver. A dirty filter can easily be observed looking through the inlet louver blade. Since maximum cooling capability of the unit is obtained with maximum evaporator air flow, a closed inlet louver and dirty air filter will decrease cooling capacity, and may cause ice to form on the evaporator coil.

g. Outlet Louver. The outlet louver is finger-adjustable in both horizontal and vertical planes. This adjustment on an individual blade basis allows maximum control over the direction of outlet air. The best distribution pattern for outlet air is left to the operator's judgment; but blades should not be adjusted beyond 45°, as evaporator air flow will be impeded.

h. Condenser Louvers. The condenser louvers, located on the rear of the



REAR VIEW



FRONT VIEW

opened and closed.

i. Compressor Circuit Breaker. The compressor circuit breaker is a safety device which provides overcurrent protection for the compressor. The compressor circuit breaker is not a control switch to be used for operating the unit. This breaker should always be kept in the ON position. If the breaker trips to the OFF position, a defective compressor or related defective electrical components, or faulty wiring, is indicated. Inadequate input power voltage will also cause the circuit breaker to trip. The unit control circuit is also connected to auxiliary contacts on the compressor circuit

sures to equalize. Manually the compressor circuit break stores electrical continuity

j. Control Circuit Breaker control circuit breaker is a vice which provides overcurrent for the control circuit unit. The control circuit b not a control switch to be u erating the unit. This bre always be maintained in the If the breaker trips to the tion, an electrical defect i trol circuit is indicated an action should be taken. Man actioning the circuit breaker to electrical continuity.

## Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

### 2-3. General.

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services (PMCS) to be performed are listed and described in paragraph 2-4. The item numbers indicate the sequence of minimum inspection requirements.

a. Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before (B) PMCS.

b. While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during (D) PMCS.

c. After you operate. Be sure to perform your after (A) PMCS.

d. If your equipment fails to operate. Troubleshoot with proper equipment. Report any deficiencies using the proper forms, see TM 38-750.

Defects discovered during operation of the unit will be noted for future correction to be made as soon as operation of the unit has ceased. Stop oper-

ation immediately if during deficiency is noted which wo the equipment if operation w ued. All deficiencies and S will be recorded, together w corrective action taken, on 2404 at the earliest possibl nity.

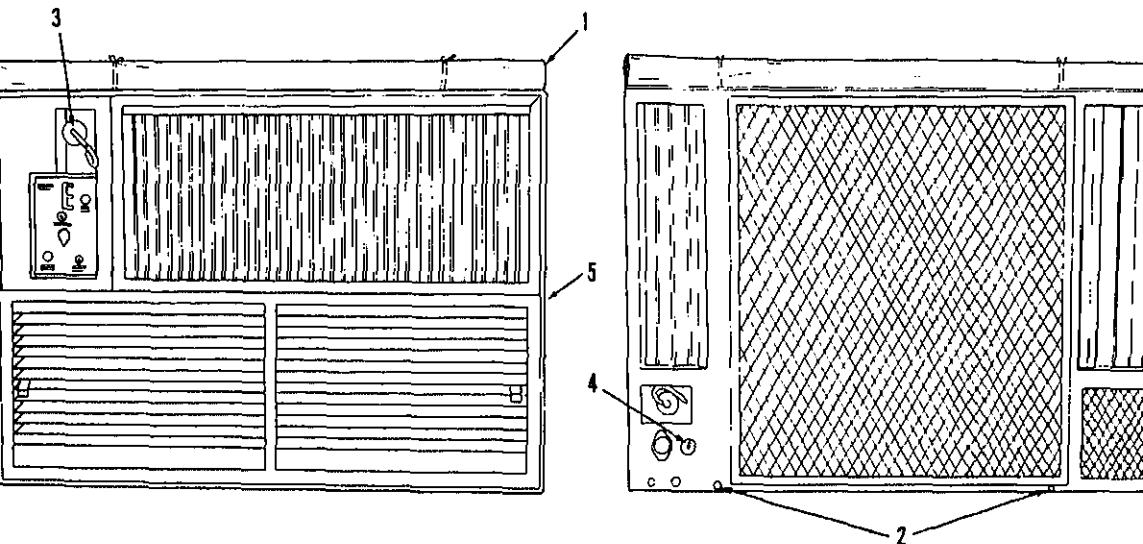
### 2-4. Daily Preventive Maint Services.

This paragraph contains listing of preventive mainte vices which must be performe erator. The item numbers ar consecutively and indicate t of minimum requirements. Re 2-1 for the daily preventive services.

#### NOTE

Use the numbers in the No. Column as a source numbers for the "TM Num column on DA Form 2404 , ment Inspection and Mai nance Worksheet, in rec results at PMCS.

**NOTE:** If the air conditioner must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make complete checks and services when the air conditioner can be shut down.



B - Before Operation

D - During Operation

A - After Operation

ITEM NO.	INTERVAL			ITEMS TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF
	B	D	A			
1	•			Condenser Cover	With cover rolled up for air conditioner operation, check securing ties for damage.	
2	•	•	•	Condensate Drains	Inspect for obstruction to drainage. Remove obstructions.	Obstructions can not be removed.
3	•			Main Power Receptacle Connector	Check for secure power connection. Tighten if necessary.	Damage to connector prevents satisfactory connection.
4		•		Liquid Sight Indicator	Check for moisture and low refrigerant charge.	Yellow indicates moisture bubbles or milky appearance indicates low charge.
5		•		Air Conditioner Operation	Check for abnormal operation vibration, unusual noise, failure to respond to controls.	Any condition in procedures column is observed.

a. The instructions in this section published for the information and guidance of the personnel responsible for the operation of the air conditioner.

b. The operator must know how to perform every operation of which the conditioner is capable. This section gives instructions on starting and stopping the air conditioner, and detailed operating instructions. Since nearly every condition presents a different problem, the operator may have to modify the given procedure to fit the condition.

#### 2. Unloading Equipment.

The total weight of the air conditioner is 435 pounds (198 kg.). Use a truck or forklift of at least 500 pounds capacity to unload the unit. Keep unit upright during the unloading operation.

#### 3. Unpacking Equipment.

Move the unit as near to the site of installation as possible. Remove crating hardware and metal straps being careful not to damage the unit with the tools used for uncrating.

#### 4. Inspecting and Servicing Equipment.

a. Inspection. Inspect the entire conditioner for signs of damage, missing or loose hardware, and any defects that may have been incurred during shipment. Report all damage and defects to organizational maintenance.

b. Servicing. Perform the daily preventive maintenance services listed in paragraph 2-4. Be sure all hardware is securely in place.

#### 5. Installation.

a. General. The air conditioner is shipped assembled and ready for operation. It contains a full charge of refrigerant and compressor oil. Install the unit on a firm, level surface to allow proper condensate drainage. Place so that the control panel and condenser and evaporator louvers are accessible to the operator and to maintenance

or discharge louvers or other opening that may cause insufficient flow of air in to or out of the air conditioner. If the unit is van mounted, report any obstructions to organizational maintenance.

b. Lifting. Check for broken or formed lifting ring attachment and hardware before lifting air conditioner. Lift with crane or forklift truck.

#### CAUTION

Use lifting harness with 4-leg spreader bar. Each leg must be capable of withstanding a concentrated load of more than 500 pounds. If spreader bar cannot be used, the angle between the harness legs and the top of the air conditioner must be not less than 45-degrees.

c. Mounting. Base mounting hole dimensions are shown on figure 2-2. Resilient mount parts shown in figure 2-3 are shipped with the air conditioner.

#### CAUTION

For safe operation connect a No. 10 AWG (min.) ground wire between the air conditioner ground connection and an earth ground, as shown in figure 2-4.

#### d. Connections.

(1) Connect air ducts to the unit as applicable to the site of installation. If the inlet grille is removed return air filter should be relocated to the return air duct at a maintainable location. Operation of unit without return air filter will cause fouling of the evaporator fan and evaporator.

(2) Connect a condensate drain to carry condensate water away from the unit. Do not connect to a drain of installation only if the drop of condensate is objectionable.

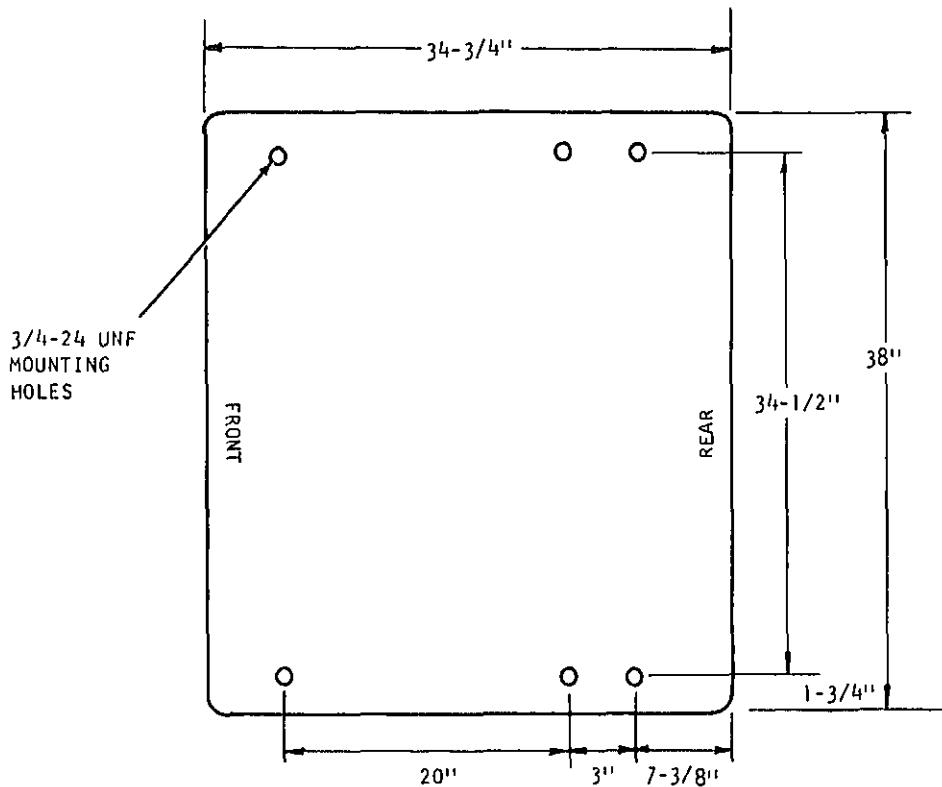


Figure 2-2. Base mounting holes

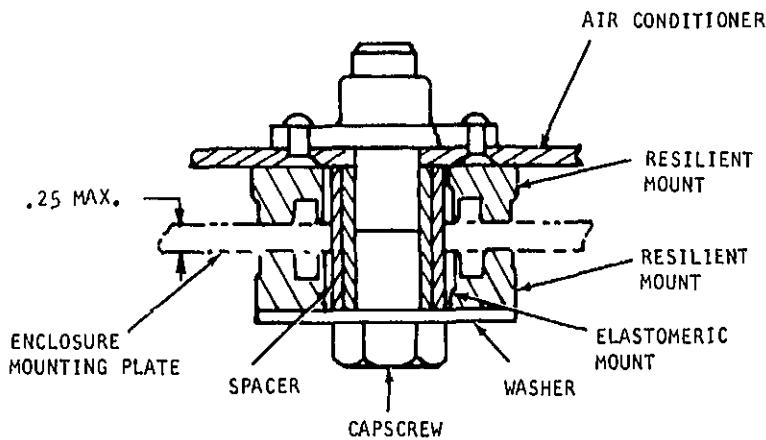


Figure 2-3. Typical installation of air conditioner to enclosure

er input connector plug furnished with the air conditioner to a suitable electrical power cable. Connect the cable to the proper electrical power source and install the plug end of cable to either the main power receptacle or the alternate power receptacle. If alternate power receptacle J12 is used, refer to wiring diagram (figure 1-5) and change wire lead connection at TBL.

**CAUTION**

To avoid damage to the compressor, electrical input power must be applied to energize the compressor crank-case heater at least 4 hours before operating unit in the cool mode.

**2-10. Starting and Operating Instructions.**

**a. Preparation for Starting.**

(1) Perform the daily preventive maintenance service (para 2-4).

(3) Check drain holes to that they are open.

(4) Be sure the unit is secured.

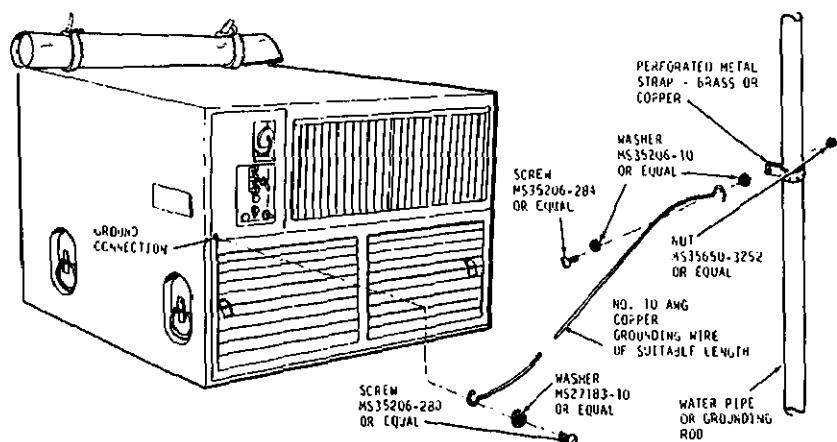
(5) Roll up condenser cover at top of air conditioner to condenser opening.

**NOTE**

When vent damper door is open to admit fresh air, partially close evaporator inlet louvers to balance incoming air. Vent or damper door closed during heavy rain.

**b. Starting Instructions for Cooling.** Start the air conditioner for cooling as shown in figure 2-5.

**c. Operating Instructions for Cooling.** Operate the air conditioner for cooling as shown by figure



**INSTALLATION**

STEP 1. CLEAN FRONT OF GROUND CONNECTION TO OBTAIN A BRIGHT METAL SURFACE.

STEP 2. REMOVE INSULATION FROM ENDS OF GROUNDING WIRE OR USE BARE WIRE. MAKE LOOP AT WIRE ENDS.

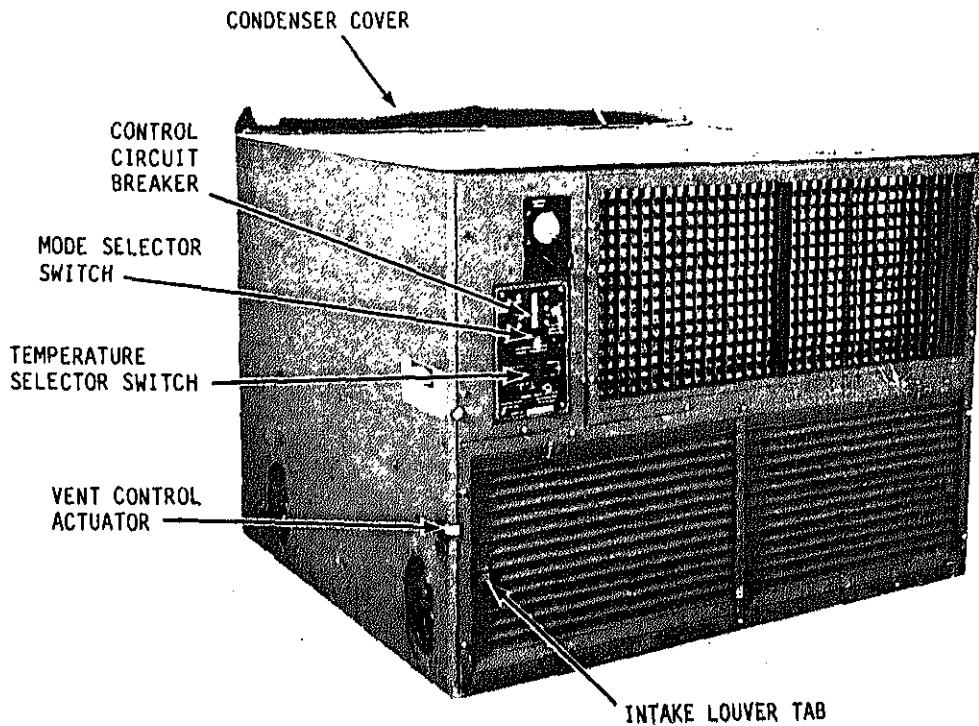
STEP 3. USING 1/4-20 SCREW AND WASHER, ATTACH ONE END OF WIRE TO AIR CONDITIONER FRONT PANEL GROUND CONNECTION.

STEP 4. WRAP A SUITABLE LENGTH OF PERFORATED STRAP AROUND CLEAN SURFACE ON WATER PIPE OR GROUNDING ROD. DO NOT USE GAS PIPE.

STEP 5. USING 1/4-20 SCREW, TWO WASHERS AND NUT, ATTACH OTHER END OF GROUNDING WIRE TO STRAP IN A MANNER SUCH AS TO SECURELY TIGHTEN STRAP TO PIPE AND WIRE TO STRAP.

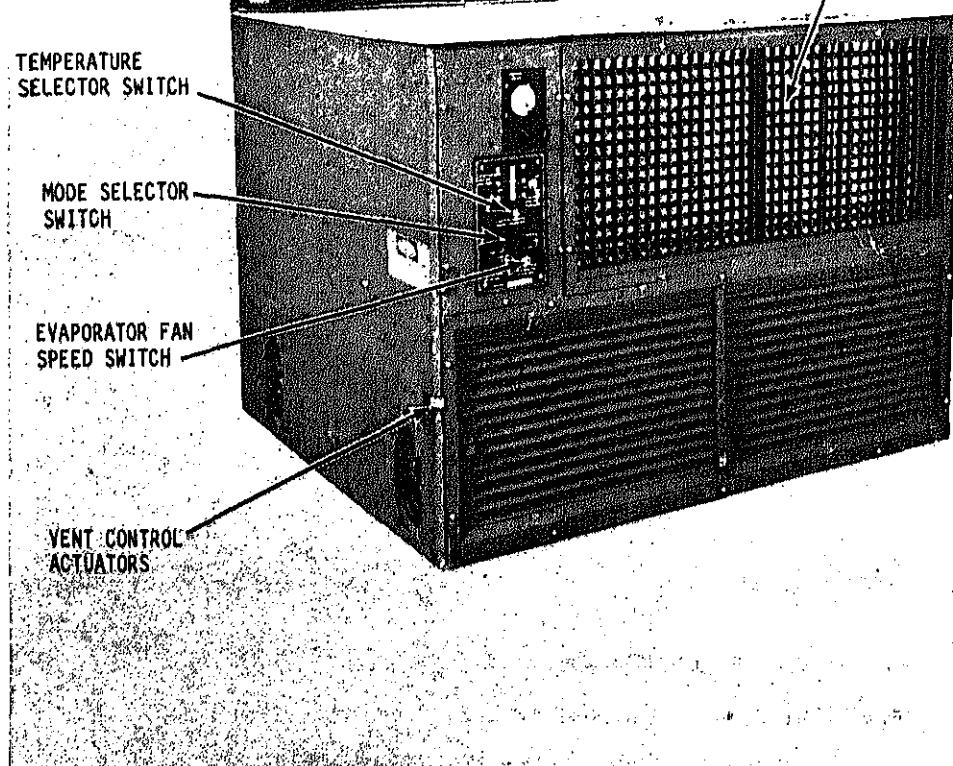
Figure 2-4. Ground wire installation

AFTER STARTING, ADJUST TEMPERATURE  
SELECTOR SWITCH TO OBTAIN DESIRED  
ENCLOSURE TEMPERATURE.



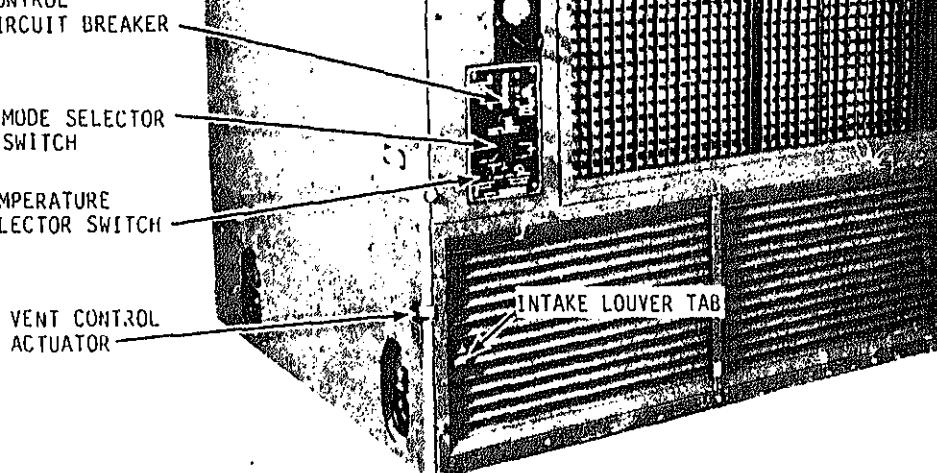
- STEP 1. ROLL UP AND TIE CONDENSER COVER.
- STEP 2. OPEN INTAKE LOUVERS BY LIFTING TABS.
- STEP 3. TURN VENT CONTROL ACTUATOR TO CLOSE VENTILATION DAMPER.
- STEP 4. TURN TEMPERATURE SELECTOR SWITCH TO MAXIMUM CLOCKWISE POSITION (WARMER).
- STEP 5. TURN ON COMPRESSOR AND CONTROL CIRCUIT BREAKERS.
- STEP 6. TURN MODE SELECTOR SWITCH TO VENT AND ALLOW FAN TO REACH FULL SPEED, THEN TURN TO COOL.

Figure 2-5. Starting instructions for cooling



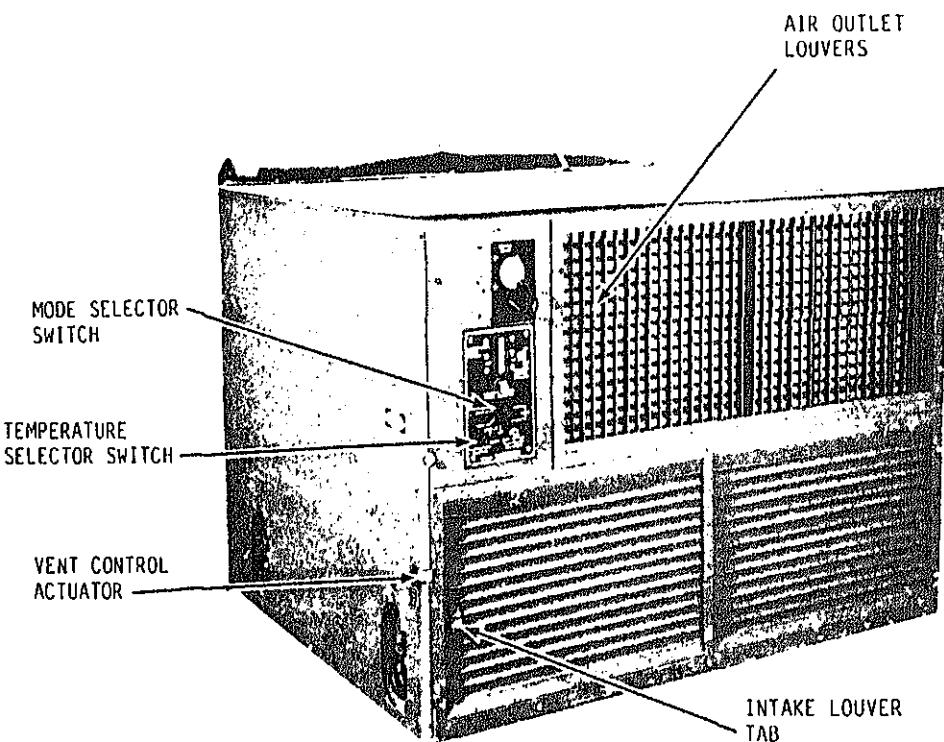
- STEP 1. WITH MODE SELECTOR SWITCH ON COOL, ADJUST TEMPERATURE SELECTOR SWITCH TO DEGREE OF COOLING DESIRED.
- STEP 2. SET EVAPORATOR FAN SPEED SWITCH TO DESIRED POSITION.
- STEP 3. ADJUST AIR OUTLET LOUVERS TO DIRECT AIR FLOW AS DESIRED.
- STEP 4. ADJUST VENT CONTROL ACTUATOR TO ADMIT DESIRED AMOUNT OF VENTILATION

Figure 2-6. Operating instructions for cooling



- STEP 1. MAKE SURE CONDENSER COVER IS ROLLED UP.
- STEP 2. OPEN INTAKE LOUVERS BY LIFTING TABS.
- STEP 3. TURN VENT CONTROL ACTUATOR TO CLOSE VENTILATION DAMPER.
- STEP 4. TURN TEMPERATURE SELECTOR SWITCH TO MAXIMUM COUNTERCLOCKWISE POSITION (WARMER).
- STEP 5. TURN ON CONTROL CIRCUIT BREAKER.
- STEP 6. TURN MODE SELECTOR SWITCH TO LOW HEAT. TURN TO HIGH IF MORE HEAT IS DESIRED.

Figure 2-7. Starting instructions for heating

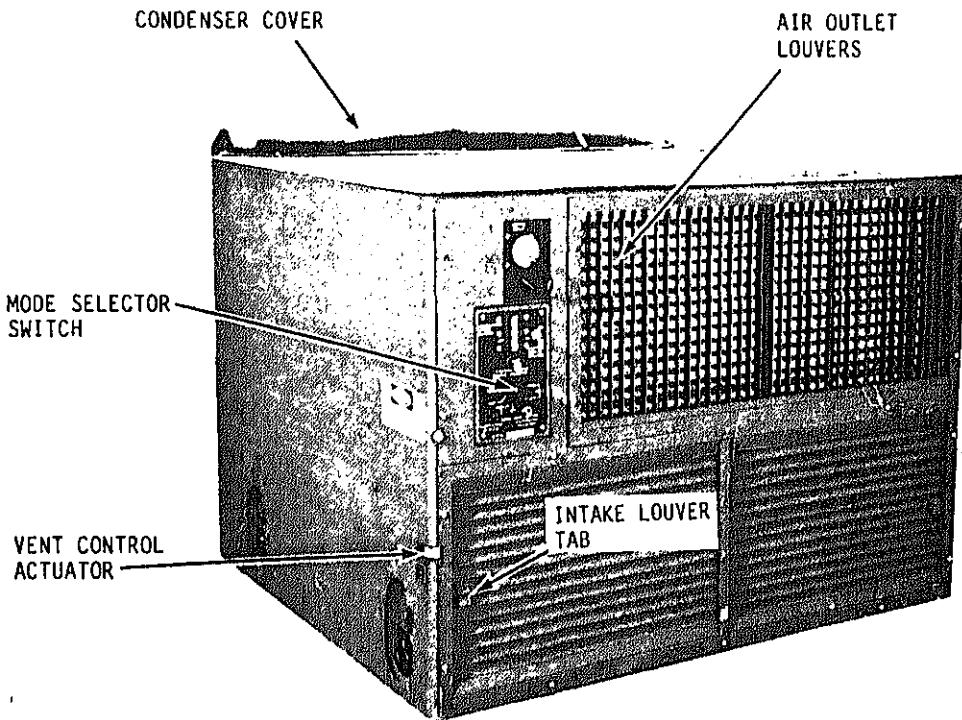


NOTE: AFTER STARTING, ADJUST TEMPERATURE  
SELECTOR SWITCH TO OBTAIN  
DESIRED ENCLOSURE TEMPERATURE

- STEP 1. TURN VENT CONTROL ACTUATOR TO OPEN DAMPER DOOR.
- STEP 2. POSITION TABS TO PARTIALLY CLOSE INTAKE LOUVER BLADES.
- STEP 3. TURN MODE SELECTOR TO HIGH HEAT OR LOW HEAT FOR DESIRED TEMPERATURE RANGE.
- STEP 4. ADJUST TEMPERATURE SELECTOR SWITCH TO DESIRED ENCLOSURE TEMPERATURE.
- STEP 5. ADJUST AIR OUTLET LOUVERS TO DIRECT AIRFLOW AS DESIRED.

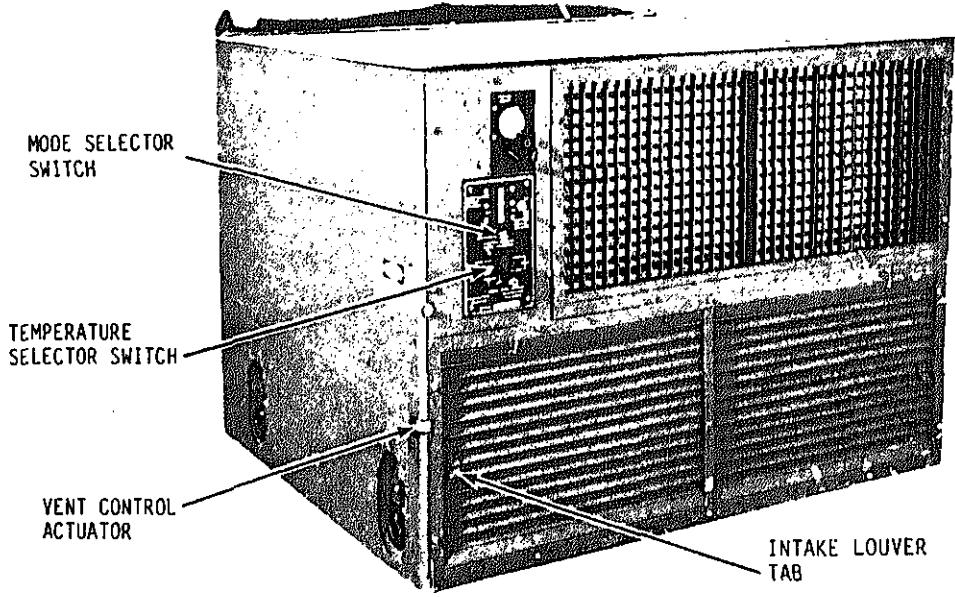
NOTE: AFTER TURNOFF, OPERATE IN VENT MODE (FIGURE 2-9) FOR 2 - 3 MINUTES TO COOL OFF HEATING ELEMENTS.

Figure 2-8. Operating instructions for heating



- STEP 1. MAKE SURE CONDENSER COVER IS ROLLED UP.
- STEP 2. TURN VENT CONTROL ACTUATOR TO OPEN DAMPER DOOR.
- STEP 3. POSITION TABS TO PARTIALLY CLOSE INTAKE LOUVER BLADES.
- STEP 4. TURN MODE SELECTOR SWITCH TO VENT.

Figure 2-9. Operating instructions for ventilation



- STEP 1. TURN MODE SELECTOR SWITCH TO OFF.
- STEP 2. POSITION TABS TO CLOSE INTAKE LOUVERS.
- STEP 3. TURN ACTUATOR TO CLOSE FRESH AIR VENT DAMPER.

NOTE: IF SHUTDOWN IS FOR AN EXTENDED PERIOD, COVER EVAPORATOR AND CONDENSER GRILLES AND DISCONNECT POWER CABLE.

Figure 2-10. Air conditioner stopping instructions

g. Start the air conditioner for as shown in figure 2-7.

#### Operating Instructions for

g. Operate the air conditioner rating as shown in figure 2-8.

#### Operating Instructions for Ventil-

ation Operate the air conditioner for as shown by figure 2-9.

Preparation for Movement. To e the air conditioner for move- proceed as follows.

Dismantling for Movement.

Disconnect main power cable.

Disconnect drain line from out-

Disconnect air ducts and installaporator inlet and outlet s.

Remove unit from mounting sur-

If air conditioner is to be moved long distance, recrate it.

Reinstallation After Movement.

er movement, follow procedures in aph 2-9 to reinstall the air ioner.

#### Identification.

Identification. Each air cond- has one major identification mounted on the side of the unit. ate specifies nomenclature, manu- er, military part number, BTU/hr., hertz, volts, serial number, con- number, and shipping weight. A cturer's identification plate d just below the military plate ns the manufacturer's name and ad- and the model and serial numbers.

Information Plates. The air con- er has the following information pertinent to operation.

1) Wiring Diagram Plate. It is d on the top of the unit. This rates complete air conditioner .

cated on the top of the unit. The plat illustrates complete air conditioner re- frigerant system.

(3) Ventilation Instruction Plate. It is located on the left front side of the unit. This plate indicates the direction to turn vent adjusting knob to open or close the damper door in the ventilation air duct.

(4) Control Module Instruction Plate. It is located on the front of the unit. This plate indicates the fol- lowing.

(a) The ON and OFF positions of the control circuit breaker.

(b) The ON and OFF positions of the compressor circuit breaker.

(c) The various heating and cool- ing positions for the mode selector switch.

(d) Temperature increase and de- crease positions for the temperature se- lector switch.

(e) The HIGH and LOW positions o the evaporator fan speed switch.

(f) The manufacturer's model num- ber of the unit.

(g) The part number of the plate.

(5) Main Power Plate. It is lo- cated on the front of the unit above the control module and contains the main power receptacle.

(6) High Pressure and Low Pressure Reset Plates. They are located on the left side of the unit below the service valve access panel. These plates indi- cate location of the high and low pres- sure reset buttons.

(7) Service Valves. The high pres- sure and low pressure service valve plates are located on the left side of the unit above the service valve access panel. These plates indicate the loca- tion of the service valves.

(8) Danger Warning Plate. It is located on the right side of the air conditioner near the front. This plate warns of the hazard in operating the ai- conditioner without a grounding wire.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 2-16. Operation in Extreme Cold.

a. General. The air conditioner is designed to operate on the heating cycle in ambient temperatures as low as minus 50°F (-45°C) and on cooling cycle with 0°F (-18°C) air entering the condenser and 70°F (21°C) air entering the evaporator.

b. Before Operation. Before starting on cooling cycle be sure cover is removed from condenser air intake and discharge. Clear all ice and snow from openings. Be sure all dampers are in operating condition.

c. After Operation. Install cover over condenser air intake and discharge openings.

#### CAUTION

Do not disturb wiring during cold weather unless absolutely necessary. Cold temperatures make wiring and insulation brittle and easily broken.

### 2-17. Operation in Extreme Heat.

a. General. The air conditioner is designed to operate satisfactorily at temperatures up to plus 120°F (49°C). If unit is operated at condenser inlet temperatures higher than 120°F (49°C), the cooling capacity will be lowered, and long periods of operation at extended temperatures may cause compressor or condenser fan motor to overheat and trip their internal overload switches or the high pressure cutout switch to shut the unit off.

b. Filters. To maintain the highest capacity of the unit, the return air filter and fresh air screen should be cleaned weekly or more often if necessary. Dirty filters reduce the flow of air across the evaporator coil, thereby reducing the capacity of the air conditioner.

c. Guards and Louvers. Keep guards and louvers clean and free of obstruction to maintain full air flow through the air conditioner.

d. Coils. Clean evaporator and condenser coils as frequently as necessary to prevent dirt or other matter obstructing the air flow.

### 2-18. Operation in Dusty or Sandy Areas.

a. Protection. Shield the air conditioner from dust as much as possible. Take advantage of any natural barriers which offer protection.

b. Cleaning. Keep the air conditioner as clean as possible. Pay particular attention to the louvers, coils, electrical components and grilles. Use compressed air, if available, to aid in cleaning.

#### c. Air Filters and Coils.

(1) Under extremely dusty conditions, the louvers, filters, electrical components and grille should be serviced more often.

#### NOTE

Never operate the unit without having the air filters in place.

(2) The condenser coil is exposed to ambient air. Therefore it requires cleaning more often than the evaporator coil.

### 2-19. Operation Under Rainy or Wet Conditions.

Take special precautions to keep equipment dry. If installed outdoors, cover the equipment with a waterproof cover when it is not in use. Remove cover during dry periods. Take necessary precautions to keep the electrical components free from moisture.

Make sure power is disconnected from air conditioner before touching any wiring or other electrical parts.

2-20. Operation in Salt Water Areas.

**WARNING**

Disconnect power source prior to washing the air conditioner.

water at frequent intervals. Be careful not to damage electrical system wires. Special attention must be given to prevent rust and corrosion.

b. Painting. Paint all exposed areas where paint has cracked, peeled, or blistered, or report condition to organizational maintenance. Coat exposed areas of polished metal with a light coat of grease.



## Section I. LUBRICATION INSTRUCTIONS

### Fan Motors.

The evaporator and condenser motors are permanently lubricated by the manufacturer and require no additional lubrication.

### 3-2. Compressor.

The compressor and compressor motor are fully lubricated by the manufacturer and require no additional lubrication.

## Section II. TROUBLESHOOTING

### General.

This section contains information is useful in diagnosing and detecting troubles which cause unsatisfactory operation or failure of the conditioner.

### Operator's Troubleshooting Chart.

Troubleshooting procedures for operator crew are listed in table 3-1.

This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the air conditioner. Each malfunction for an individual component, unit, or system is

followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all functions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or corrected by listed corrective actions, notify your supervisor.

c. The table lists the common malfunctions which you may find during operation or maintenance of the air conditioner or its components. You should perform the tests/inspections and corrective actions in the order listed.

## Section III. MAINTENANCE PROCEDURES.

### General.

This section contains maintenance procedures for the operator of the air conditioner. Operator maintenance is limited to inspection and procedures which can be accomplished without the aid of servicing tools. Any indications of trouble for servicing resulting from inspection are to be reported to organizational or direct support maintenance.

### Condenser Fabric Cover.

Inspect condenser fabric cover for torn places. Repair minor tears with waterproof tape. Report extensive damage to organizational maintenance.

### 3-7. Drains.

Inspect condensate water drains, figure 1-2, for obstructions. Remove obstructions. Report total blockage to organizational maintenance.

### 3-8. Liquid Sight Indicator.

Wipe refrigerant liquid sight indicator glass, figure 1-2, with a soft, clean cloth, set controls, figure at COOL-COOLER, operate air conditioner for 15 minutes, then observe liquid sight indicator. Yellow appearance indicates moisture in system. Bubbles or milky flow indicate low refrigerant charge. Report presence of these conditions to direct support maintenance.

TEST OR INSPECTION  
CORRECTIVE ACTION

1. AIR CONDITIONER FAILS TO OPERATE

Step 1. Check to see if main power cord is plugged in.

Connect power cable to receptacle (fig. 2-1) supplying 208 3 phase power of the proper frequency.

Step 2. Check to see if compressor circuit breaker is in OFF position.

Reset circuit breaker (fig. 2-1).

Step 3. Check to see if mode selector switch is in OFF position.

Turn selector switch to desired operation (fig. 2-1).

Step 4. If air conditioner still is inoperative, report condition to organizational maintenance.

2. INSUFFICIENT COOLING

Step 1. Check to see if mode selector switch is in proper position.

Set switch to COOL (fig. 2-1).

Step 2. Check to see if temperature selector switch is in correct position.

Adjust setting to COOLER (fig. 2-1).

Step 3. Check to see if sufficient air is passing over evaporator coil.

Open evaporator inlet louvers (fig. 2-1). Remove any obstructions from evaporator inlet and outlet louvers.

Step 4. Inspect for clogged air filter.

Report clogged filter condition to organizational maintenance.

Step 5. Check to see if too much outside air is entering unit.

Close or adjust damper door (fig. 2-1).

Step 6. Check to see if the system contains sufficient refrigerant by inspecting liquid sight indicator (para 3-8).

Report low refrigerant condition to direct support maintenance.

Step 7. Check to see if evaporator fan speed switch is set to LOW speed position.

Reset switch to HIGH speed position (fig. 2-1).

Step 8. Check to see if sufficient air is passing through condenser coil.

Remove any obstructions from condenser fan inlet and outlet louvers.

TEST OR INSPECTION  
CORRECTIVE ACTION

---

• NO HEAT OR LOW CAPACITY HEAT

Step 1. Check to see if mode selector switch is properly set.

Set switch to LOW HEAT or HIGH HEAT (fig. 2-1).

Step 2. Check to see if temperature selector switch is set correctly.

Adjust to WARMER setting (fig. 2-1).

Step 3. Check for insufficient air movement over heaters.

Remove any obstructions from evaporator air intake and discharge louvers. Make sure intake louvers are open (fig. 2-1).



# ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

## Section I. SERVICE UPON RECEIPT OF MATERIAL

### 4-1. General.

Instructions for unloading, unpacking and installing the air conditioner are covered in Chapter 2, Section III.

### 4-2. Inspecting and Servicing Equipment.

General inspection of the equipment is covered in Chapter 2, Section II. If possible damage has occurred, requiring removal of covers or other components not authorized for removal by the operator, further inspection of internal components is to be performed by organizational maintenance personnel. If other than new equipment has been received, a thorough inspection is to be performed. Make a thorough check to see

that all wiring, lines and tubing are secure. Pay particular attention to evaporator and condenser coils and power receptacle connectors. Be sure that all visible wiring and insulation are not broken or frayed. Also check the evaporator and condenser fan motor.

### 4-3. Return Air Filter.

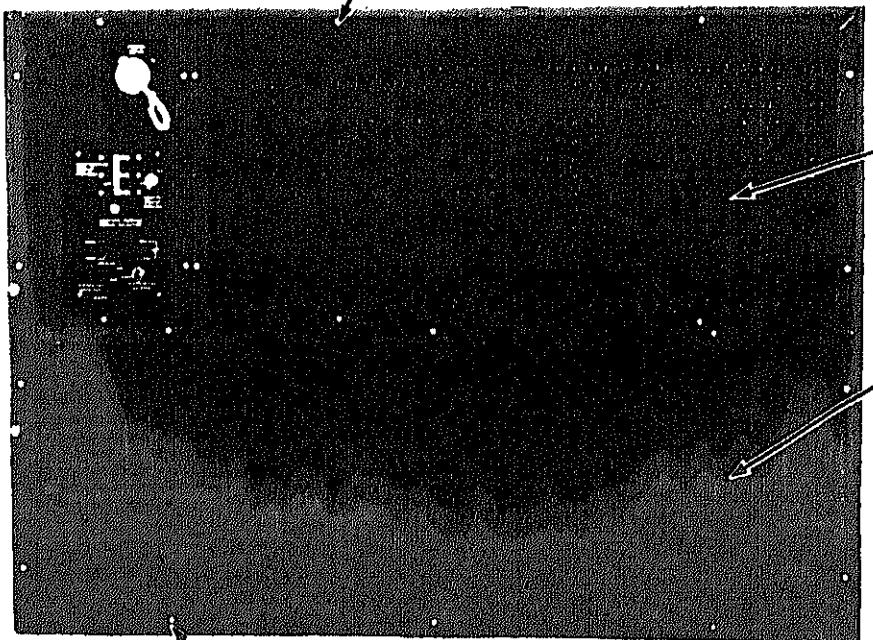
#### a. Removal.

(1) Refer to figure 4-1 and remove evaporator air inlet louver.

(2) Refer to figure 4-2 and remove the return air filter from the four outer retaining clips.

b. Service. Service the return filter as follows:

REMOVE SCREW (8) AND LOCKWASHER (8)



REMOVE SCREW (10) AND LOCKWASHER (10)

Figure 4-1. Evaporator inlet and outlet louvers, removal and installation.

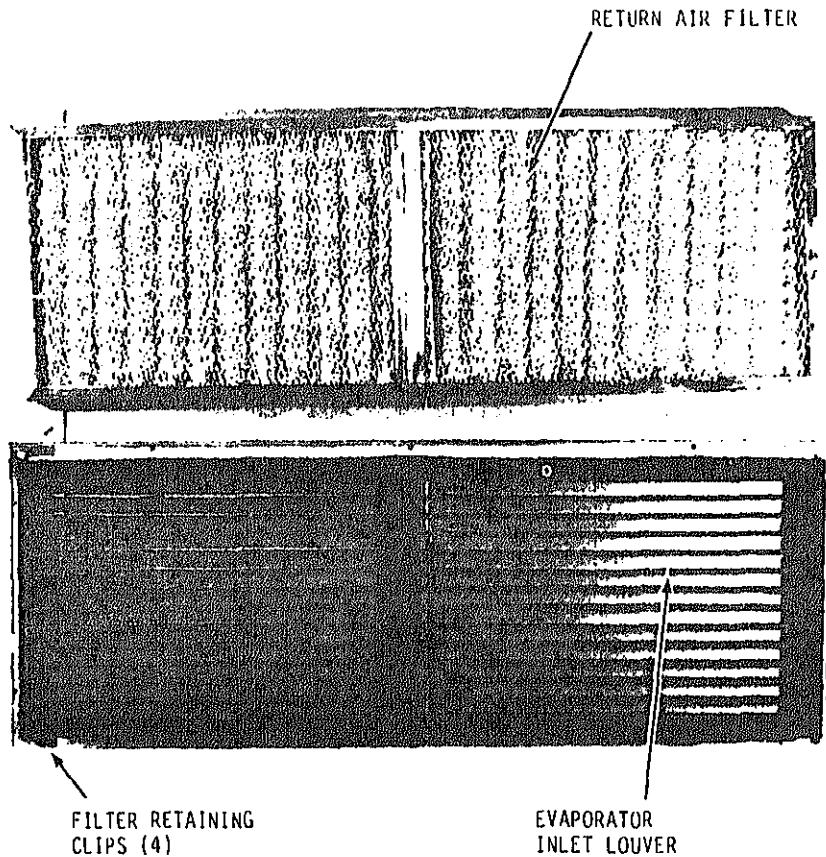


Figure 4-2. Return air filter

## WARNING

Cleaning solvent, Federal Specification P-D-680, Type II, used for cleaning electrical parts, is flammable and gives off poisonous vapors. Use only in a well ventilated area. Avoid prolonged breathing of vapors. Keep solvent and vapors away from open flame. Do not use in excessive amounts.

(1) Clean filter with cleaning solvent (Fed. Spec. P-D-680) if lubricating oil is used as the dust collecting adhesive. Clean filter with water if a

water soluble filter coater is used or the duct collecting adhesive. Flush filter with solvent or water in opposite direction of air flow. Be careful not to damage filter during cleaning. Replace filter if the frame is bent or filtering material is damaged.

(2) Shake excess solvent or water from filter and allow to dry thoroughly. If available, low pressure compressed air (15 psig) can be used to speed drying. When using compressed air for cleaning filter always direct the air stream in the opposite direction of the filter air flow. Hold the air nozzle a safe distance away from the filter to prevent compressing or separating the filter material.

collecting adhesive (see Appendix F) by immersion or spraying. Make sure that the total air filtering surface is thoroughly covered with the adhesive when spraying the filter. Allow excessive adhesive to drain before installing filter.

c. Installation.

(1) Refer to figure 4-2 and slide the air filter into four filter retaining clips.

(2) Refer to figure 4-1 and install evaporator inlet louver.

**4-4. Condenser Guard.**

Remove any obstructions. Brush off loose dirt and wipe clean.

(1) Refer to figure 4-3 and condenser guard.

(2) With guard removed, will condenser coil clean.

b. Installation.

(1) Refer to figure 4-3 and condenser guard.

**4-5. Evaporator Coil and Condenser Coil.**

The coils (heat exchangers) should be serviced as often as necessary to maximum operating capacity of unit. Dirt and lint loaded coils or bent fins not only restrict normal velocity of air flow but also insulate the coils thus reducing their efficiency.

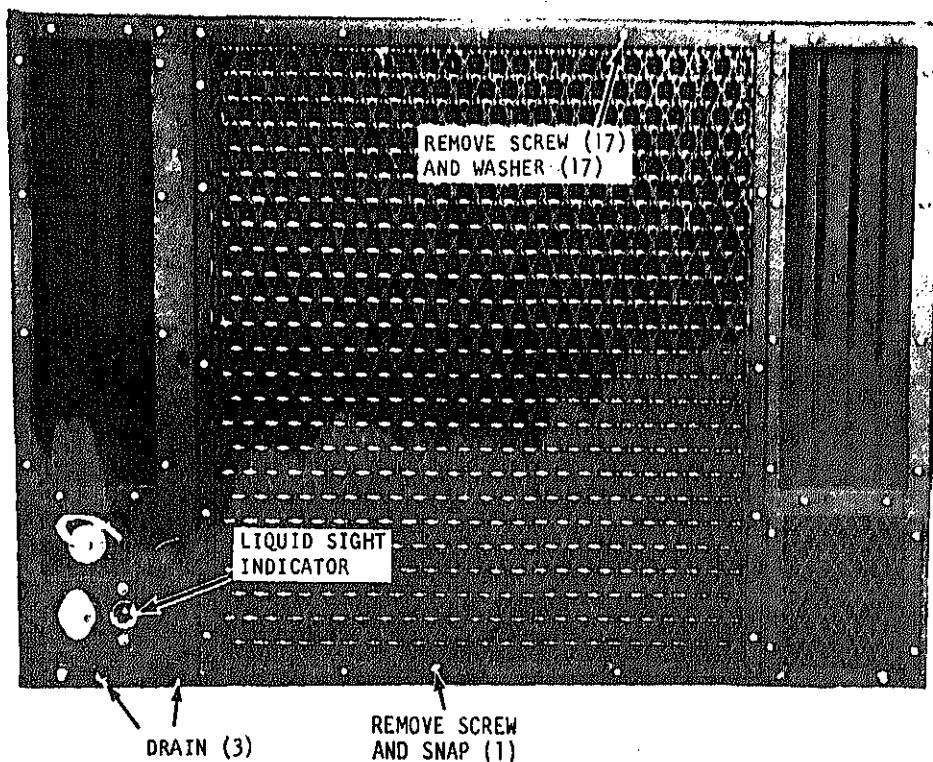


Figure 4-3. Condenser guard removal and installation

External coil surfaces may need interal clogging. Clean external surfaces with a soft-bristled brush or a plastic in comb. The plastic fin comb can be used to straighten bent coil fins. Clean internally-clogged coils with compressed air. Always direct the compressed air stream straight into coils, to avoid bending fins, and in the opposite direction of normal air flow. Remove covers and louvers (figure 4-1, 4-3 and 4-4) to service coils.

#### -6. Top Covers and Condenser Cover.

##### a. Removal.

(1) Refer to figure 4-4 and remove top front cover. Remove this cover first as it provides access to one screw of the center cover that is not visible from the outside.

(2) Remove condenser cover and top rear cover.

(3) Remove top center cover.

pair minor tears with waterproof tape. Inspect top covers for dents, breaks, chipped paint and damaged gaskets or insulation. Inspect for minor dents in top covers and make sure that covers are installed flush with mating surfaces of the housing. If top covers cannot be repaired, install replacement covers.

c. Installation. Refer to figure 4-4 and install top covers and condenser cover as follows:

(1) Install top center cover.

(2) Install top rear cover and condenser cover.

(3) Install top front cover.

#### 4-7. Evaporator Inlet and Outlet Covers.

a. Removal. Refer to figure 4-4 and remove evaporator inlet and outlet covers.

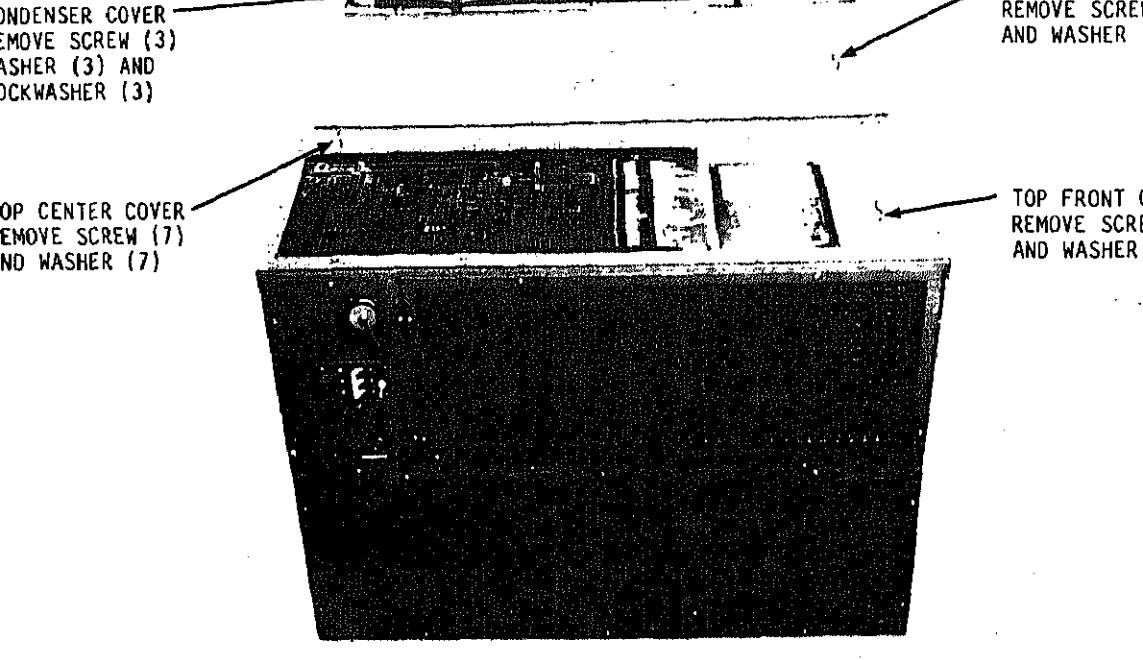


Figure 4-4. Top covers and condenser cover, removal and installation

and install evaporator inlet and outlet louvers.

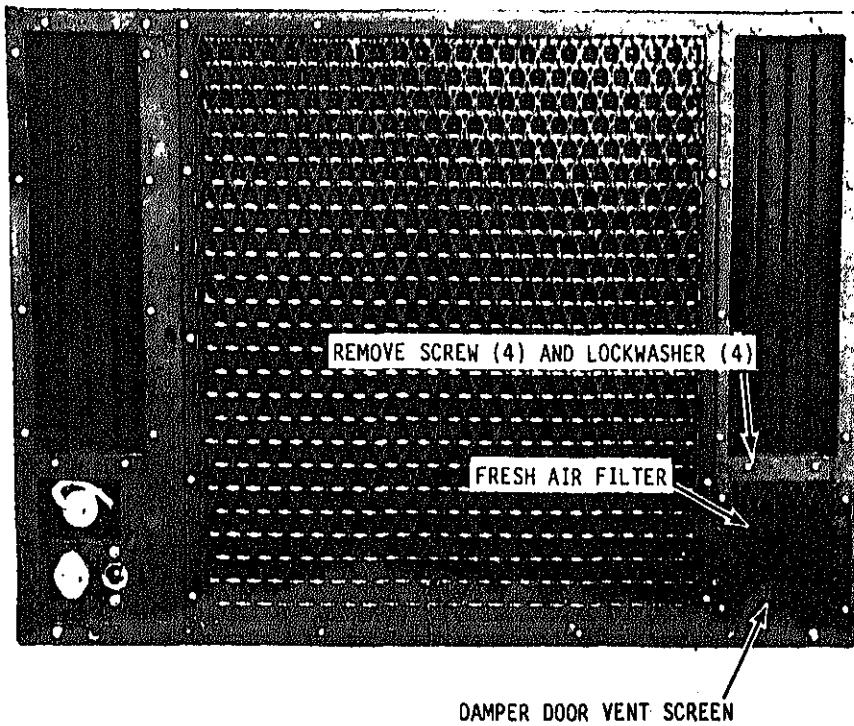
the filter (in the damper door vent screen pocket) with clear water and dry.

c. Damper Door Vent Screen and Fresh Filter.

a. Removal. Refer to figure 4-5 and remove damper door vent screen with fil-

NOTE

The fresh air filter is a 1/2-inch thick piece of cellulose sponge 4 inches wide and 6 inches long, inserted into the vent door screen.



E: DO NOT REMOVE FRESH AIR FILTER FROM SCREEN POCKET -- FLUSH FILTER WITH CLEAN WATER AND DRY THROUGHLY.

ure 4-5. Damper door vent screen and fresh air filters, removal and installation.

c. Installation. Refer to figure and install vent door screen with filter.

. Mist Eliminator.

a. Removal.

(1) Refer to figure 4-4 and remove front cover.

(2) Refer to figure 4-6 and lift mist eliminator.

b. Inspection and Service.

(1) Inspect the face area of the mist eliminator for breaks, or any other physical damage, and clogged areas.

(2) Although the mist eliminator should not require any service normally, it may become clogged and dirty. The cleaning procedure is the same as for servicing the fresh air filter (para 4-3).

c. Installation.

(1) Refer to figure 4-6 and install mist eliminator by sliding down into position.

(2) Refer to figure 4-4 and replace top front cover.

4-10. Air Conditioner Installat

Check air conditioner for prop  
stallation. If auxiliary power c  
tion is to be used, change leads  
shown on wiring diagram, figure

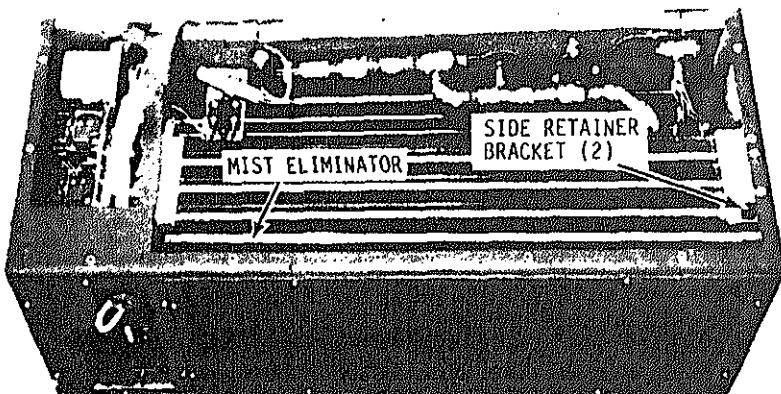


Figure 4-6. Mist eliminator removal and installation

Section II. MOVEMENT TO A NEW WORKSITE

Not applicable.

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-11. Tools and Equipment.

No tools or equipment are issued with the air conditioner.

4-12. Special Tools and Equipment.

No special tools or equipment are required for maintenance of the air conditioner.

4-13. Maintenance Repair Parts

Repair parts and equipment are and illustrated in the repair pa special tool list covering organizational maintenance for this eq

Section IV. LUBRICATION INSTRUCTIONS

4-14. Fan Motors.

The evaporator fan and condenser fan motors are permanently lubricated by the manufacturer and require no additional lubrication.

4-15. Compressor.

The compressor and compresso are fully lubricated by the man and require no additional lubri

eriodic maintenance checks are re-  
ed by organizational maintenance  
onnel to check the performance of  
y preventive maintenance services.  
tional periodic maintenance services  
required beyond the scope of the op-  
or's maintenance.

. Quarterly Preventive Maintenance Services.

. This paragraph contains a tabu-  
ed listing of preventive maintenance  
ices which must be performed by or-

val is equal to three calendar months  
or 250 hours of operation, whichever  
curs first.

b. The item numbers are listed con-  
secutively and indicate the sequence  
inspection and minimum requirements.  
Refer to table 4-1 for quarterly pre-  
tive maintenance services.

c. Some services are required at  
shorter interval and are so noted. Ser-  
vice intervals should be shortened under  
extreme or unusual conditions.

Table 4-1. Organizational Preventive Maintenance Checks and Services

Item No.	Interval							Item To Be Inspected	Procedures	Equipment Will Be Reported Not Ready (Red) If:		
	W-Weekly		M-Monthly		Q-Quarterly S-Semiannually							
	W	M	Q	S	A	B	H	MI				
1	•								Air Filter and Mist Eliminator	Inspect and service as necessary (para. 4-3 and 4-9)	Air Filter or Mist Eliminator faulty beyond servicing	
2	•								Fresh Air Screen	Inspect and clean or replace as necessary	Fresh air screen faulty beyond servicing	
3		•							Evaporator Coil and Condenser Coil	Clean and Inspect (para 4-5)	Coil damaged	
4		•							Housing Covers	Repair or replace damaged covers (para. 4-6)	---	
5		•							Wiring and Electrical Components	Check for damaged or frayed wiring. Check for defective electrical components. Repair or replace defective wiring. Replace defective electrical components	Repair requires opening refrigeration system.	
6		•							Refrigeration System	Check compressor, valves, and piping for damage. Report damage to direct support maintenance	Repair requires opening refrigeration system.	

#### 4-18. General.

This section contains troubleshooting instructions for the isolation of causes and common troubles that may occur during operation, and also gives the possible remedies to correct the trouble.

#### 4-19. Organizational Troubleshooting Chart.

a. General. Troubleshooting procedures for organizational maintenance personnel are listed in table 4-2. As shown in the table, troubleshooting begins by identifying the malfunction. Next, suitable tests or inspections are made in step-by-step order. Finally, a corrective action is given. Remedies beyond the scope of organizational maintenance must be reported to direct support maintenance personnel. Additional procedures are given in paragraphs(b) and (c) which follow:

b. Control Circuit. The cause for the failure of the system to operate can be narrowed to a specific portion of the system if the control component associated with the failure can be isolated. It is the purpose of safety devices to open the circuit under certain overload

or fault conditions. If a safe is open, additional checking is to determine if the open is due to faulty safety device or if the device is performing its intention, and the fault is located in the system. To check the circuit, proceed as follows:

(1) Disconnect air conditioner source of power.

(2) Using a series test lead ohmmeter, check the continuity each control in the affected circuit with the control in the closed while being checked. Use the schematic and wiring diagram for two-point circuit tracing.

(3) Replace each defective item with a serviceable like item.

c. Safety Devices. When testing control circuit and associated components, take into account the normal state of the safety device. Determine (1) whether it is normal for the device to be open under the existing condition or (2) if the open condition is caused by trouble elsewhere in the air conditioner.

operating checks.

## MALFUNCTION

### TEST OR INSPECTION

### CORRECTIVE ACTION

#### 1. AIR CONDITIONER FAILS TO OPERATE

Step 1. Check to see if main power cable is connected.

Connect cable to power source.

Step 2. Check to see if main power receptacle is defective.

Replace defective connector.

Step 3. Check for loose electrical connections.

Tighten loose connections.

Step 4. Check to see if mode selector rotary switch is improperly positioned or is defective.

Turn selector to COOL or VENT. Replace switch if defective (para 4-26).

Step 5. Check to see if control circuit breaker or compressor circuit breaker is in OFF position or is defective.

Reset circuit breaker(s) or replace defective circuit breaker (para 4-26).

Step 6. Remove service valve access panel (figure 1-2) and check to see if high pressure or low pressure switch has cutout.

Reset high pressure or low pressure cutout. Note that time delay relay starts compressor 30 seconds after reset.

Step 7. Test control circuit transformer and rectifier for faulty operation.

Replace defective transformer and/or rectifier (para 4-28 and 4-29).

#### 2. INSUFFICIENT COOLING

Step 1. Check to see if the mode selector switch is improperly positioned.  
Set switch to COOL.

Step 2. Check to see if temperature selector control is improperly positioned or is defective.

Adjust setting or replace switch (para 4-26).

FAULT/JUNCT.	TEST OR INSPECTION	CORRECTIVE ACTION
2. INSUFFICIENT COOLING ~ Continued		
Step 3.	Check to see if fresh air damper control is incorrectly improperly adjusted.	Verify setting and, if necessary, correct adjustment of control (para 4-39).
Step 4.	Check to see if evaporator outlet louver is bent or stuck closed position.	Repair or replace louver. (para 4-7)
Step 5.	Inspect condenser coil for dirt accumulation.	Clean coil (para 4-5).
Step 6.	Inspect evaporator return air filter for dirt accumulat-	Clean filter (para 4-3).
Step 7.	Check to see if evaporator fan is loose or defective.	Tighten if loose or replace if defective (para 4-21).
Step 8.	Check evaporator fan motor for a defective thermal pro-	Replace thermal protector (para 4-22).
Step 9.	Check to see if evaporator fan motor is worn or defecti-	Report deficiency to direct support maintenance or repl (para 4-21).
Step 10.	Check refrigerant system for insufficient charge by ins- liquid sight indicator. Presence of bubbles indicates refrigerant charge.	Report low-charge condition to direct support maintenan-
Step 11.	Check for intermittent compressor operation.	Report condition to direct support maintenance.
3. EVAPORATOR OR CONDENSER FAN FAILS TO OPERATE		
Step 1.	Check to see if main power cable is connected.	Connect cable to power source.
Step 2.	Check to see if main power receptacle or plug connector defective.	Replace connectors or receptacle.

TEST OR INSPECTION  
CORRECTIVE ACTION

EVAPORATOR OR CONDENSER FAN FAILS TO OPERATE - Continued

- Step 3. Check to see if mode selector rotary switch is improperly adjusted or is defective.  
Replace switch if defective (para 4-26).
- Step 4. Check to see if evaporator fan speed control switch is defective.  
Replace defective switch (para 4-26).
- Step 5. Check to see if condenser fan motor thermal protector is defective.  
Replace defective thermal protector (para 4-24).
- Step 6. Check to see if evaporator fan motor thermal protector is defective.  
Replace defective thermal protector (para 4-22).
- Step 7. Check to see if evaporator fan or condenser fans are binding.  
Relieve binding or replace fan (para 4-21).
- Step 8. Check to see if condenser fan high-low thermostat switch is defective.  
Replace defective thermostat switch (para 4-31).
- Step 9. Test condenser fan relay for defective operation.  
Replace defective relay (para 4-27).
- Step 10. Test evaporator fan motor and condenser fan motor for defective operation.  
Replace defective fan motor (para 4-21 and 4-23).

COMPRESSOR WILL NOT START

- Step 1. Set circuit breakers to ON position. Turn mode selector switch to COOL position and temperature selector switch to COOLER position.  
Reset controls properly.
- Step 2. Check for defective or tripped compressor internal temperature overload switch.  
Set circuit breaker and mode selector switch to off. Disconnect main power cable for 45 minutes; then, reconnect cable and reset controls. If condition continues, report deficiency to direct support maintenance.
- Step 3. Check for loose electrical connections or faulty wiring.  
Tighten loose connections. Repair faulty wiring.

**MALFUNCTION**

**TEST OR INSPECTION**  
**CORRECTIVE ACTION**

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**4. COMPRESSOR WILL NOT START - Continued**

Step 4. Test for open control circuit by means of continuity check (para 4-32).

Report open-circuit condition to direct support maintenance.

Step 5. Check to see if contacts on high or low pressure cutout switch are open.

Reset pressure switches. If condition continues, report to direct support maintenance.

Step 6. Test control circuit breaker and compressor circuit breaker for faulty operation.

Replace defective circuit breaker (para 4-27).

Step 7. Test control transformer and rectifier for defective operation.

Replace defective transformer (para 4-28) and defective rectifier (para 4-29).

Step 8. Test for defective time delay relay.

Replace defective relay (para 4-27).

Step 9. Test for defective compressor relay.

Replace defective relay (para 4-27).

Step 10. Check to see if compressor motor is defective. Test for grounded winding (para 4-35).

Report motor-fault condition to direct support maintenance.

**5. COMPRESSOR STARTS BUT CUTS OUT ON OVERLOAD**

Step 1. Check for high pressure due to improper condenser coil air flow.

Clean condenser coil and louvers. Verify proper operation of condenser fans and louvers.

Step 2. Test condenser fan for motor failure.

Replace defective motor (para 4-23).

**6. EVAPORATOR AIR OUTPUT VOLUME LOW**

Step 1. Check to see if evaporator fan speed switch is set at low speed.

Reset switch to HIGH speed.

Step 2. Check for dirty or damaged filter or mist eliminator.

Clean or replace filter (para 4-3). Clean or replace mist eliminator (para 4-9).

TEST OR INSPECTION  
CORRECTIVE ACTION

EVAPORATOR AIR OUTPUT VOLUME LOW - Continued

- Step 3. Check for iced or dirty evaporator coil.
  - De-ice and clean coil (para 4-5).
- Step 4. Inspect evaporator fan for defect.
  - Replace defective fan.
- Step 5. Test fan motor for faulty operation.
  - Replace motor (para 4-21).

CONDENSER AIR OUTLET VOLUME LOW

- Step 1. Check for dirty condenser coil or guard.
  - Clean coil and guard (para 4-4).
- Step 2. Check to see if air outlet louvers are stuck in closed position.
  - Free louvers and control cable. Adjust control, or notify direct support maintenance if actuating cylinder is not functioning properly.
- Step 3. Check for defective HIGH-LOW condenser fan thermostatic switch.
  - Replace switch (para 4-26).
- Step 4. Inspect for defective condenser fan.
  - Replace fan.
- Step 5. Test for defective fan motor.
  - Replace motor (para 4-23).

AIR CONDITIONER FAILS TO HEAT

- Step 1. Check to see if mode selector switch is improperly adjusted.
  - Reset selector LOW heat or HIGH heat.
- Step 2. Check to see if temperature selector control is set correctly.
  - Adjust control to WARMER.
- Step 3. Inspect evaporator return air filter for dirty condition.
  - Clean filter (para 4-3).
- Step 4. Inspect for defective temperature selector switch or mode selector switch.
  - Replace defective switch (para 4-26).

**MALFUNCTION**  
**TEST OR INSPECTION**  
**CORRECTIVE ACTION**

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**8. AIR CONDITIONER FAILS TO HEAT - Continued**

- Step 5. Inspect for defective heater high temperature cutout switch.  
Replace defective thermostatic switch (para 4-31).
- Step 6. Test for defective heater relay.  
Replace defective relay (para 4-27).
- Step 7. Inspect and test for defective heaters and associated  
Tighten connections and repair damaged wiring. Replace  
heaters (para 4-30).
- Step 8. Test for defective evaporator fan motor.  
Replace motor (para 4-21).

**9. EXCESSIVE NOISE**

- Step 1. Check evaporator fan or condenser fan for loose blade  
mounting.  
Tighten fan blade on motor shaft. Tighten all mounting.
- Step 2. Test for defective or worn evaporator or condenser fan  
Replace worn or defective motor (para 4-21 and 4-23).
- Step 3. Check to see if compressor knocks or chatters.  
Stop air conditioner and report condition to direct su  
maintenance.

## 20. Electrical System.

This section describes the testing, removal, and installation of the electrical system components which are the responsibility of organizational maintenance. Refer to the schematic (figure 4) for component nomenclature and as a guide for troubleshooting. Use the wiring diagram (figure 1-5) to check the intact connections of wiring.

### 21. Evaporator Fan and Motor Assembly

a. General. The evaporator fan motor is a multispeed motor. The 400 Hz motor operates at 3750 RPM in high speed and 1800 RPM in low speed. The 60 Hz motor operates at 3450 RPM in high speed and 1725 RPM in low speed. The motor contains separate windings for high or low speed operation and each winding is thermally protected. Motor speed is

manually controlled by the evaporator fan speed switch.

b. Controls. Before removing the evaporator fan and motor assembly, turn the mode selector switch, evaporator speed switch, and control circuit breaker (para 4-26) and evaporator fan motor low/high speed switch (para 4-27) which control operation of the motor. If electrical control components or wires that supply power to the motor are found defective and the motor does not operate, proceed as follows:

#### c. Removal.

(1) Refer to figure 4-1 and remove the evaporator air inlet louver.

(2) Refer to figure 4-7 and remove the evaporator fan and motor assembly.

(3) Refer to figure 4-8 and disassemble the fan and motor assembly.

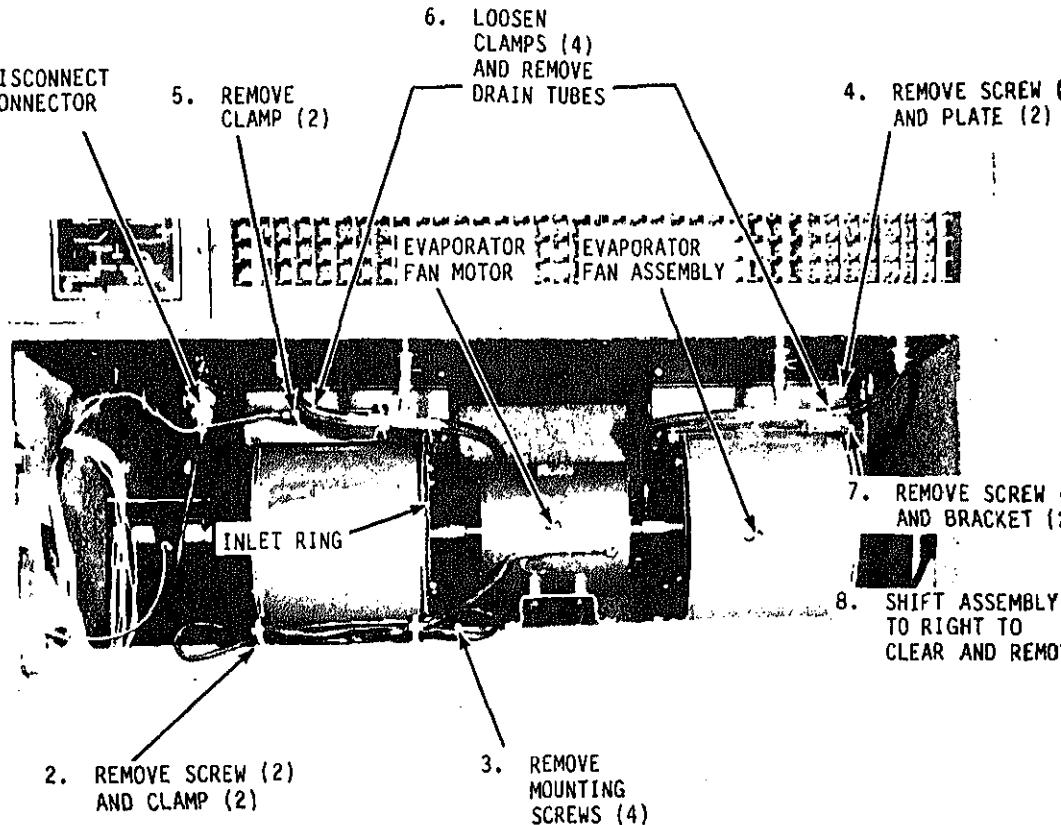


Figure 4-7. Evaporator fan and motor assembly, removal and installation

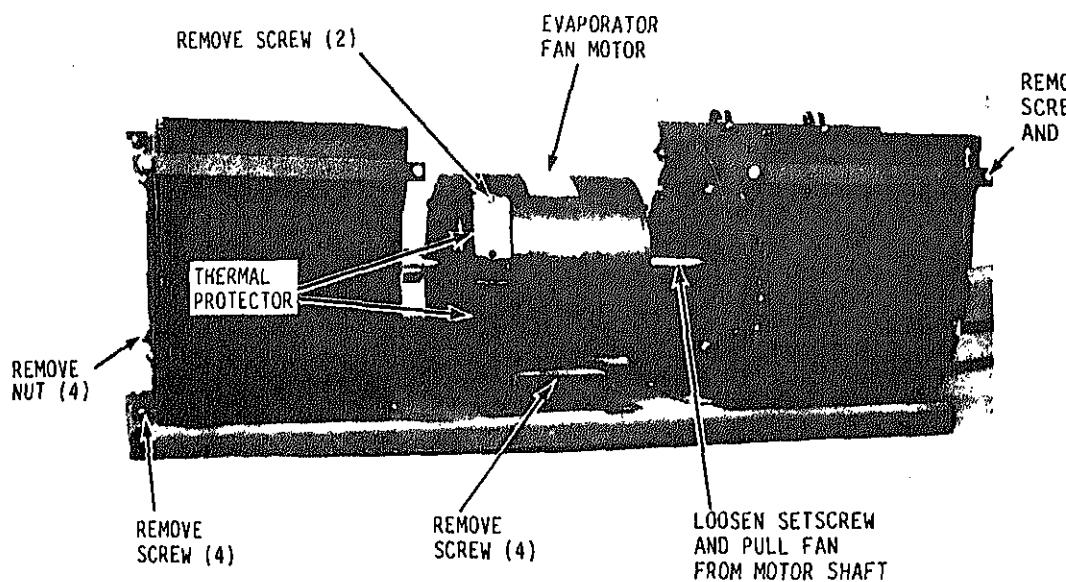


Figure 4-8. Evaporator, fan, motor, and thermal protector, removal and instal-

d. Test.

(1) Refer to figure 4-8 and remove housing from the high and low speed motor winding thermal protectors. Refer to para 4-22c and test thermal protectors.

(2) Test the motor for open-circuited or grounded windings as follows.

(a) Using a multimeter, test at P3 for continuity across a combination of two leads until each of the three high speed winding leads is tested. Do the same for the three low speed winding leads. If continuity is not indicated, the winding is open and the motor should be replaced.

(b) Using a multimeter, test for continuity by placing one test probe against the motor housing (on bare metal only) and the other probe against each of the motor winding leads. If continuity is indicated, the winding is grounded, and the motor should be replaced.

(c) Reinstall housing on thermal protector.

e. Installation.

(1) Refer to figure 4-8 and assemble the fan and motor assembly.

(2) Refer to figure 4-7 and install evaporator fan and motor assembly.

(3) Refer to figure 4-1 and install the evaporator air inlet louver.

4-22. Evaporator Fan Motor Thermal Protector.

a. General. There are two automatic reset thermal protectors on the evaporator fan motor. Both thermal protectors are similar in appearance. One provides overload protection for the low speed motor winding while the other provides protection for the high speed motor winding.

b. Removal.

(1) Refer to paragraph 4-21c and remove evaporator fan and motor assembly.

(2) Refer to figure 4-8 and solder thermal protectors.

continuity across each pair of terminal connections. If continuity is not indicated, the thermal protector is defective and must be replaced.

. Installation.

(1) Refer to figure 4-8, install thermal protectors.

(2) Refer to paragraph 4-21e and all evaporator fan and motor assembly.

. Condenser Fan and Motor Assembly

. General. The condenser fan motors are multispeed motors. The 400 Hz motors operate at 3750 RPM in high speed and 1800 RPM in low speed. The 60 Hz motors operate at 3450 RPM in high speed and 1725 RPM in low speed. The motors have separate windings for high or low speed operation and each winding is normally protected. Motor speed is automatically controlled by an outdoor ambient switch (figure 1-2). The motors operate at low speed until the outdoor ambient temperature rises above  $5^{\circ}\text{F}$  ( $37.8^{\circ}\text{C}$   $\pm 3^{\circ}\text{C}$ ).

. Test. Before removing a condenser fan motor, test mode selector switch control circuit breaker (para 4-26) and the fan motor high/low speed switch (para 4-27) that control operation of the condenser fan motor. If electrical control components or wiring that supply power to the motor are not defective and the motor does not operate, remove the condenser fan and motor assembly (c. 4-24) and make the following tests:

(1) Test the high and low motor winding thermal protectors, as in para 4-24c. Replace a defective protector as 4-24c.

(2) With the high and low speed motor winding leads disconnected from the thermal protectors, test for open or grounded windings as follows:

(a) Using a multimeter, test for continuity across a combination of two leads until each of the three high speed winding leads is tested. Do the same for the three low speed winding leads. Continuity is not indicated, the winding is open and the motor should be replaced.

(b) Using a multimeter, test for continuity by placing one test probe against the motor housing (on bare metal only) and the other probe against each of the motor winding leads. If continuity is indicated, the winding is grounded and the motor should be replaced.

c. Removal.

(1) Refer to figure 4-4 and remove the condenser cover and top rear cover.

(2) Refer to figure 4-9 and remove the condenser fan and motor assembly.

d. Installation.

(1) Refer to figure 4-9 and install the condenser fan and motor assembly. Refer to figures 1-4 and 1-5 for electrical connections.

(2) Refer to figure 4-4 and install the condenser cover and top cover.

4-24. Condenser Fan Motor Thermal Protector.

a. General. There are two automatic reset thermal protectors on each of the condenser fan motors. Both thermal protectors are similar in appearance. One of the protectors provides overloading protection for the high speed motor windings and the other provides overloading protection for the low speed motor windings.

b. Removal.

(1) Refer to paragraph 4-23 and move the condenser fan and motor assembly.

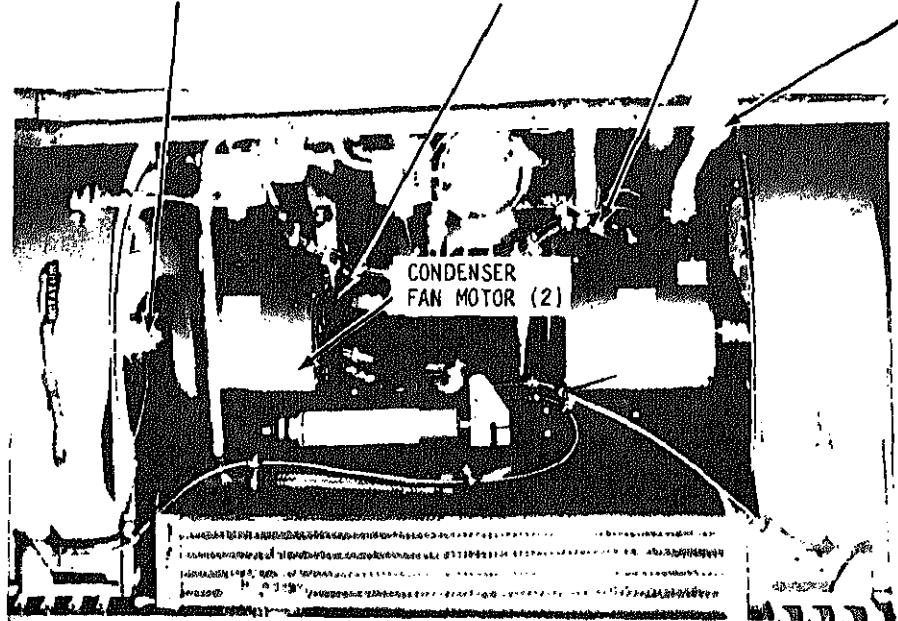
(2) Refer to figure 4-8 and remove the thermal protector.

c. Test. Using a multimeter, test for continuity across each terminal connection. If continuity is not indicated, the thermal protector is defective and must be replaced.

d. Installation.

(1) Refer to figure 4-8 and install the thermal protector.

4. LOOSEN SETSCREW,  
SLIDE FAN OFF SHAFT,  
TILT MOTOR AND LIFT OUT
3. REMOVE  
MOUNTING  
SCREW (4)
2. REMOVE  
CLAMP (2)
1. DISCONNEC  
(P4 OF



NOTE: REMOVE OTHER MOTOR IN SIMILAR MANNER

Figure 4-9. Condenser fan and motor assembly, removal and installation

(2) Refer to paragraph 4-23 and install the condenser fan and motor assembly. Ensure correct direction of rotation.

**CAUTION**

Do not turn control module mounting bolt unless unit has been disconnected from power source.

4-25. Control Module and Junction Box.

a. General. The control panel is located in the upper left front corner of evaporator section. The control module is mounted on the junction box by a long bolt with a slotted steel knob. The junction box and control module contain all of the electrical controls on the unit.

b. Removal.

(1) Refer to figure 4-4 and the top front cover.

(2) Refer to figure 4-1 and the evaporator inlet louver.

move control module and junction box.

c. Installation.

(1) Refer to figure 4-10 and install control module and junction box.

(2) Refer to figure 4-4 and install top front cover.

4-26. Control Module Components.

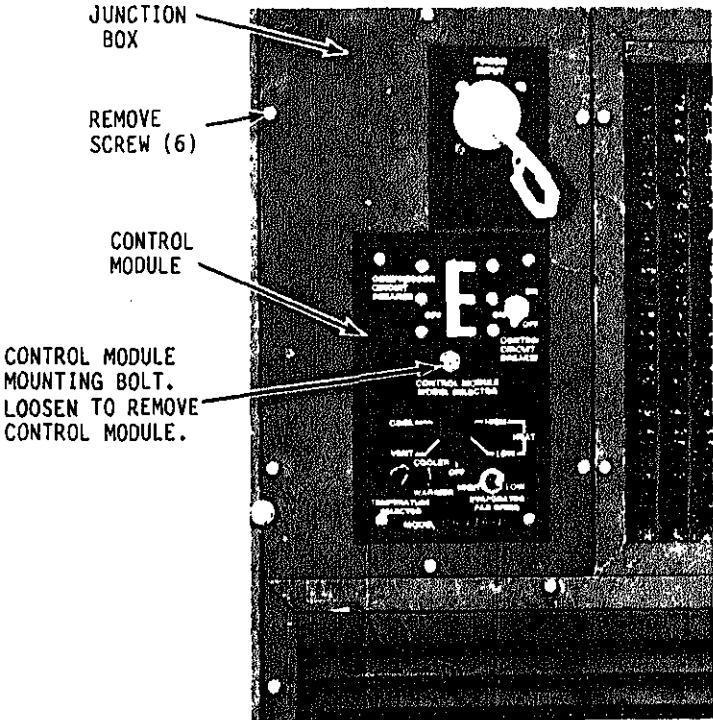
a. General. The control module components consist of the compressor circuit breaker, control circuit breaker, mode selector switch (rotary), temperature control switch, and the evaporator fan speed relay switch. All components

requirements. The compressor circuit breaker is a safety device which provides overcurrent protection for compressor. The control circuit breaker provides protection for the DC motor system.

b. Inspection and Test. Before moving any of the control module components check for loose connections, pitted contacts, and cracked or broken casings. Refer to wiring diagram figure 1-5) and check for continuity with a multimeter. If no continuity exists with the circuit breaker in the control module, or if a casing is broken or cracked, replace the circuit breaker.

**CAUTION:** BEFORE ATTEMPTING TO FULLY REMOVE CONTROL MODULE OR JUNCTION BOX, DISCONNECT THERMOSTAT SENSING BULB FROM HOUSING AND CAREFULLY THREAD BULB THROUGH OPENING IN JUNCTION BOX.

**CAUTION:** DO NOT TURN CONTROL MODULE MOUNTING BOLT UNLESS UNIT HAS BEEN DISCONNECTED FROM POWER SOURCE.



**NOTE:** INSTALL JUNCTION BOX IN UNIT. INSTALL CONTROL MODULE IN JUNCTION BOX OBSERVING CAUTION ABOVE AND ATTACHING HARDWARE.

Figure 4-10. Junction box and control module, removal and installation.

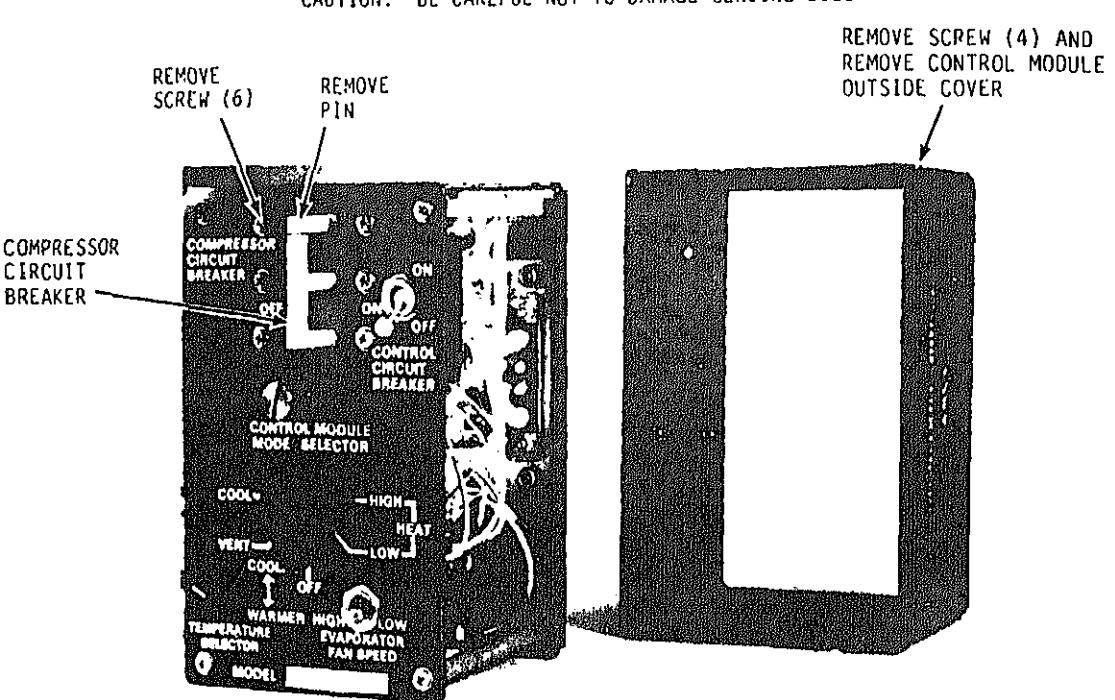


Figure 4-11. Compressor circuit breaker, removal and installation

CAUTION: BE CAREFUL NOT TO DAMAGE SENSING BULB

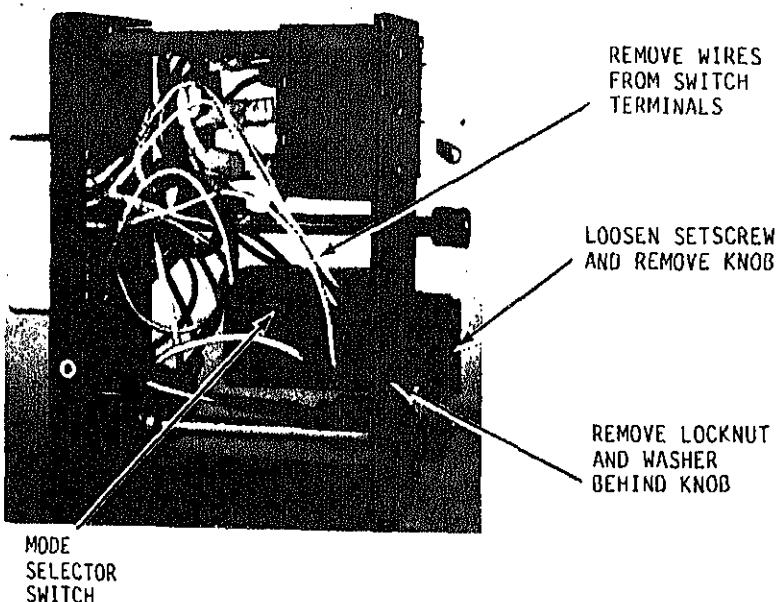


Figure 4-12. Mode selector switch removal and installation

(a) Removal.

(i) Refer to figure 4-10 and remove the control module.

(ii) Refer to figure 4-11 and remove the compressor circuit breaker. Pin assembly must be removed first before removing circuit breaker.

(b) Installation.

(i) Refer to figure 4-11 and install the compressor circuit breaker.

(ii) Refer to figure 4-10 and install the control module.

(2) Mode Selector Switch (Rotary) An electrical switch that can be manually positioned to select the desired operational mode of air conditioner. Refer to para 2-2C.

(a) Testing. Check for loose connections, loose control knob and cracked or broken casing. Check for continuity with a multimeter.

No continuity exists with switch in either one of the four "ON" positions, if the casing is broken or cracked, replace the mode selector switch. If switch is loose, tighten set screw. If switch is defective, replace.

(b) Removal.

(i) Refer to figure 4-10 and remove the control module.

(ii) Refer to figure 4-12 and remove the mode selector switch.

(c) Installation.

(i) Refer to figure 4-12 and install the selector switch.

(ii) Refer to figure 4-10 and install the control module.

(3) Temperature Control Switch.

(a) Testing. Check for loose connections, loose control knob, cracked broken casing, and kinked or brokenillary tube. Refer to wiring diagram figure 1-5) and make a continuity check. If no continuity exists when in cooling mode and the thermostat temperature is above its set point or if

the temperature control switch is loose, tighten set screw. If defective, replace.

(b) Removal.

(i) Refer to figure 4-10 and remove the control module.

(ii) Refer to figure 4-1 remove the temperature control sw

(c) Installation.

(i) Refer to figure 4-13 and install the temperature control switch.

(ii) Refer to figure 4-1 install the control module.

(4) Evaporator Fan Speed Swi

(a) Testing. Check for loose connections, mountings, and cracked broken casing. Check for continuity with a multimeter. If no continuity exists, or if the casing is broken or cracked, replace switch.

(b) Removal.

(i) Refer to figure 4-10 and remove the control module.

(ii) Refer to figure 4-1 remove the evaporator fan speed s

(c) Installation.

(i) Refer to figure 4-14 and install the evaporator fan speed

(ii) Refer to figure 4-1 install the control module.

(5) Control Circuit Breaker.

(a) Testing. Check for loose connections, mountings, and cracked broken casing. Check for continuity with a multimeter. If no continuity exists, or if the casing is broken or cracked, replace the circuit breaker.

(b) Removal.

(i) Refer to figure 4-10 and remove the control module.

(ii) Refer to figure 4-1 remove the control circuit break

ABOUT 1/2 INCH R  
AND CAREFULLY RE  
TEMPERATURE CONT

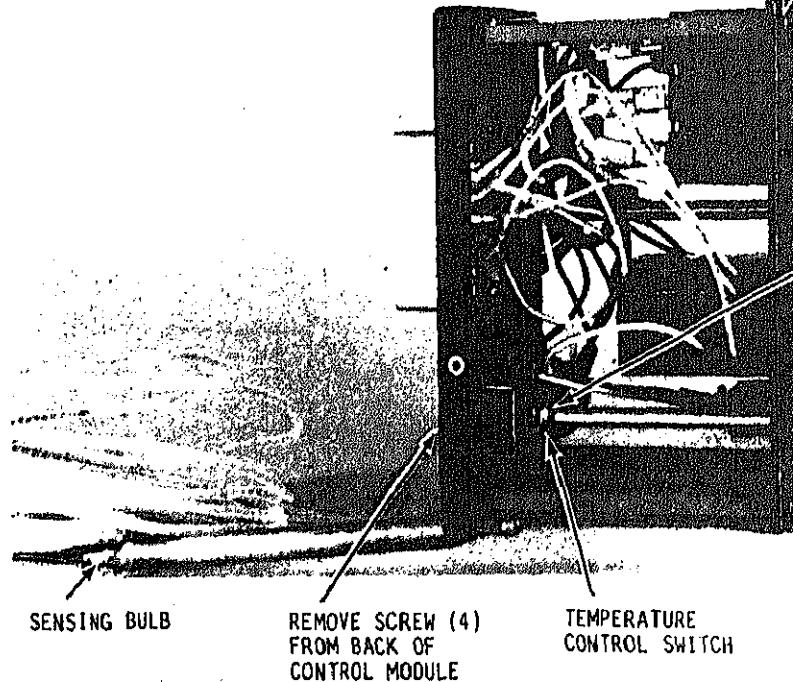


Figure 4-13. Temperature control switch, removal and in

(c) Installation.

(i) Refer to figure 4-14 and install the control circuit breaker.

(ii) Refer to figure 4-10 and install the control module.

4-27. Junction Box Components.

a. General. The junction box components consist of the following: time delay relay, evaporator fan motor low speed relay, fixed heater relay, cycling heater relay, evaporator fan motor high speed relay, condenser fan motor high speed relay, condenser fan motor low speed relay, compressor relay, and terminal boards.

b. Inspection and moving any of the junctions check for loose pitted contacts, and casings. Refer to figure 1-5) and check for multimeter. If no a casing is broken or the component.

(1) Time Delay

(a) Testing. switch to cool and no between starting of failing of compressor. less than 27 seconds seconds, replace the

(i) Refer to figure 4-10 and  
over the junction box.

(ii) Refer to figure 4-15 and  
over the time delay relay.

(c) Installation.

(i) Refer to figure 4-15 and  
tall the time delay relay.

(ii) Refer to figure 4-10 and  
tall the junction box.

relay.

(a) Removal.

(i) Refer to figure 4-1  
remove the junction box.

(ii) Refer to figure 4-  
remove the evaporator fan low sp

(b) Testing. Check for 1  
connections and cracked or broken  
ing. Check for continuity with  
meter. If no continuity exists,

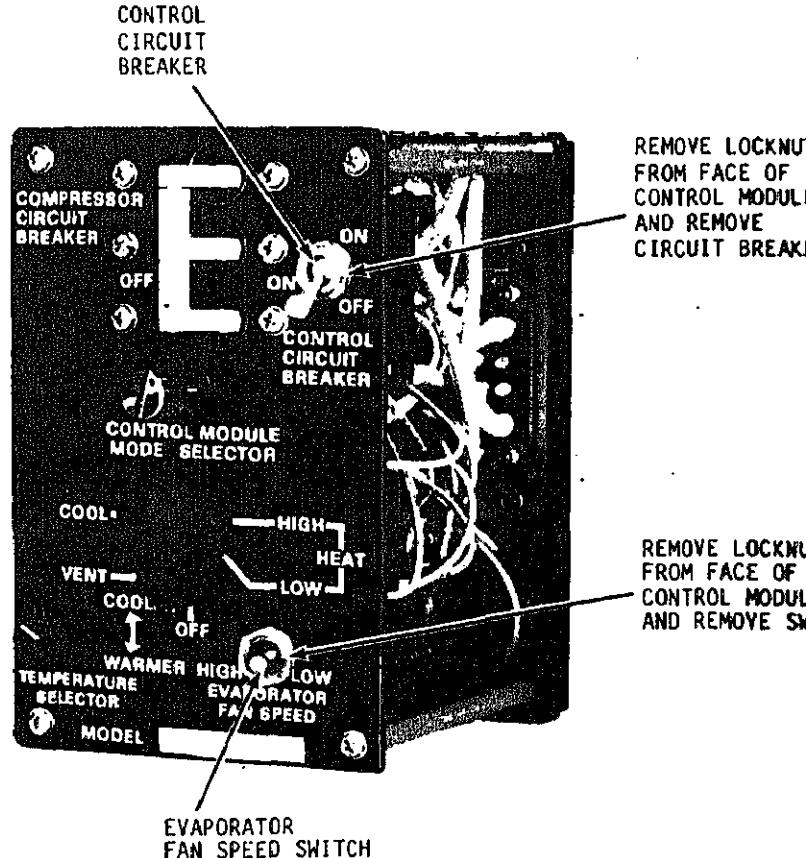


Figure 4-14. Evaporator fan motor speed switch and control circuit breaker,  
and installation

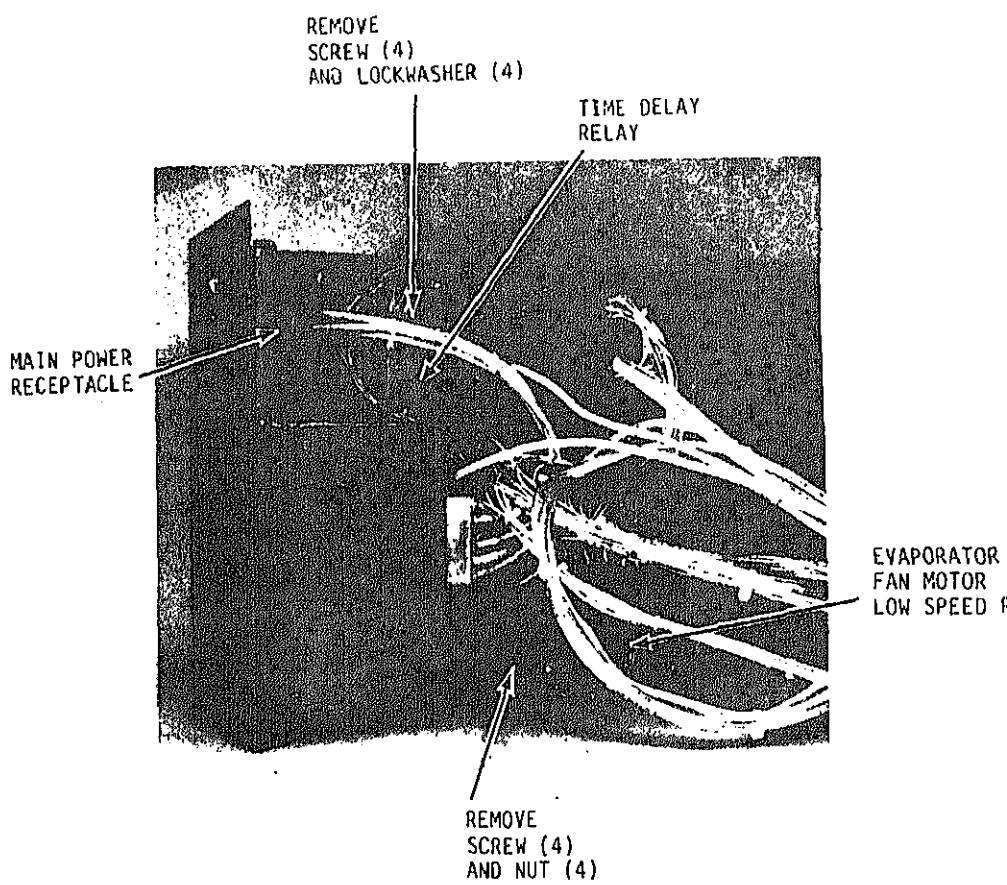


Figure 4-15. Time delay relay and evaporator fan motor low speed relay, removal

the casing is cracked or broken, replace the relay.

(c) Installation.

(i) Refer to figure 4-15 and install the evaporator fan low speed relay.

(ii) Refer to figure 4-10 and install the junction box.

(3) Fixed Heater Relay.

(a) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-11 and remove the fixed heater relay.

(b) Testing. Check for loose connections and cracked or broken wiring. Check for continuity with a meter. If no continuity exists, the casing is cracked or broken, place the relay.

(c) Installation.

(i) Refer to figure 4-16 and install the fixed heater relay.

(ii) Refer to figure 4-10 and install the junction box.

(a) Testing. Check for loose connections and cracked or broken casing. Check for continuity with a multimeter. If no continuity exists, or if the casing is cracked or broken, replace the relay.

(b) Removal.

(i) Refer to figure 4-10 and the junction box.

(ii) Refer to figure 4-16 for removal of the cycling heater relay.

(c) Installation.

(i) Refer to figure 4-16 and install the cycling heater relay.

(ii) Refer to figure 4-10 and install the junction box.

relay.

(a) Testing. Check for loose connections and cracked or broken casing. Check for continuity with a multimeter. If no continuity exists, or if the casing is cracked or broken, replace the relay.

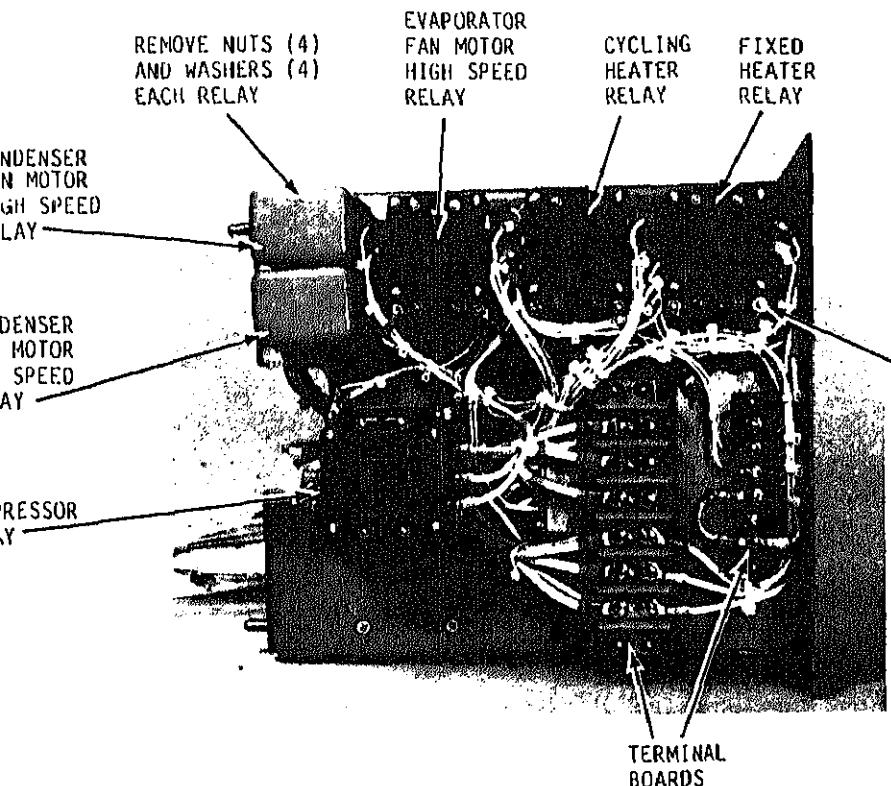
(b) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-16 and remove the evaporator fan motor high speed relay.

(c) Installation.

(i) Refer to figure 4-16 and install the evaporator fan motor high speed relay.



e 4-16. Heater relays, evaporator fan motor high speed relay, condenser fan motor relays, compressor relay and terminal boards, removal and installation.

(ii) Refer to figure 4-10 and install the junction box.

(6) Condenser Fan Motor High Speed Relay.

(a) Testing. Check for loose connections and cracked or broken casing. Check for continuity with a multimeter. If no continuity exists or if the casing is cracked or broken, replace the relay.

(b) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-16 and remove the condenser high speed relay.

(c) Installation.

(i) Refer to figure 4-16 and install the condenser high speed relay.

(ii) Refer to figure 4-10 and install the junction box.

(7) Condenser Fan Motor Low Speed Relay.

(a) Testing. Check for loose connections and cracked or broken casing. Check for continuity with a multimeter. If no continuity exists, or if the casing is cracked or broken, replace the relay.

(b) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-16 and remove the condenser low speed relay.

(c) Installation.

(i) Refer to figure 4-16 and install the condenser low speed relay.

(ii) Refer to figure 4-10 and install the junction box.

(8) Compressor Relay.

(a) Testing. Check for loose connections and cracked or broken casing. Check for continuity with a multimeter. If no continuity exists or if

the casing is cracked or broken, the relay.

(b) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-16 and remove the compressor relay.

(c) Installation.

(i) Refer to figure 4-16 and install the compressor relay.

(ii) Refer to figure 4-10 and install the junction box.

(9) Terminal Boards.

(a) Testing. Check for loose connections, loose mounting or cracked or broken casing; replace if defective.

(b) Removal.

(i) Refer to figure 4-10 and remove the junction box.

(ii) Refer to figure 4-10 and remove the terminal boards.

(c) Installation.

(i) Refer to figure 4-10 and install the terminal boards.

(ii) Refer to figure 4-10 and install the junction box.

4-28. Transformer and Resistor.

a. Removal.

(1) Refer to figure 4-10 and move the junction box.

(2) Refer to figure 4-17 and move the transformer and resistor. Move resistor from transformer if it is faulty when tested as follows.

b. Testing.

(1) Refer to wiring diagram figure 1-5 and use a multimeter to check the transformer for continuity through both the primary winding and the secondary winding. If no continuity exists through either winding, replace the transformer.

istor ohms. If measurement shows than 10  $\pm$  1 ohm, replace the resistor.

dc for the 24-volt control circuit. The capacitors reduce EMI radiation to specified levels.

### Installation.

1) Refer to figure 4-17 and install the transformer and resistor.

2) Refer to figure 4-10 and install the junction box.

### Rectifier and Capacitors

**General.** The rectifier and capacitors are located on the bottom of the junction box compartment. The rectifier-diode unit providing full-wave

#### b. Removal.

(1) Refer to figure 4-10 and remove the junction box.

(2) Refer to figure 4-17 and detach the cable from the rectifier.

(3) Remove the capacitors from the rectifier cable terminals.

(4) Remove the rectifier by removing the two mounting screws and washers.

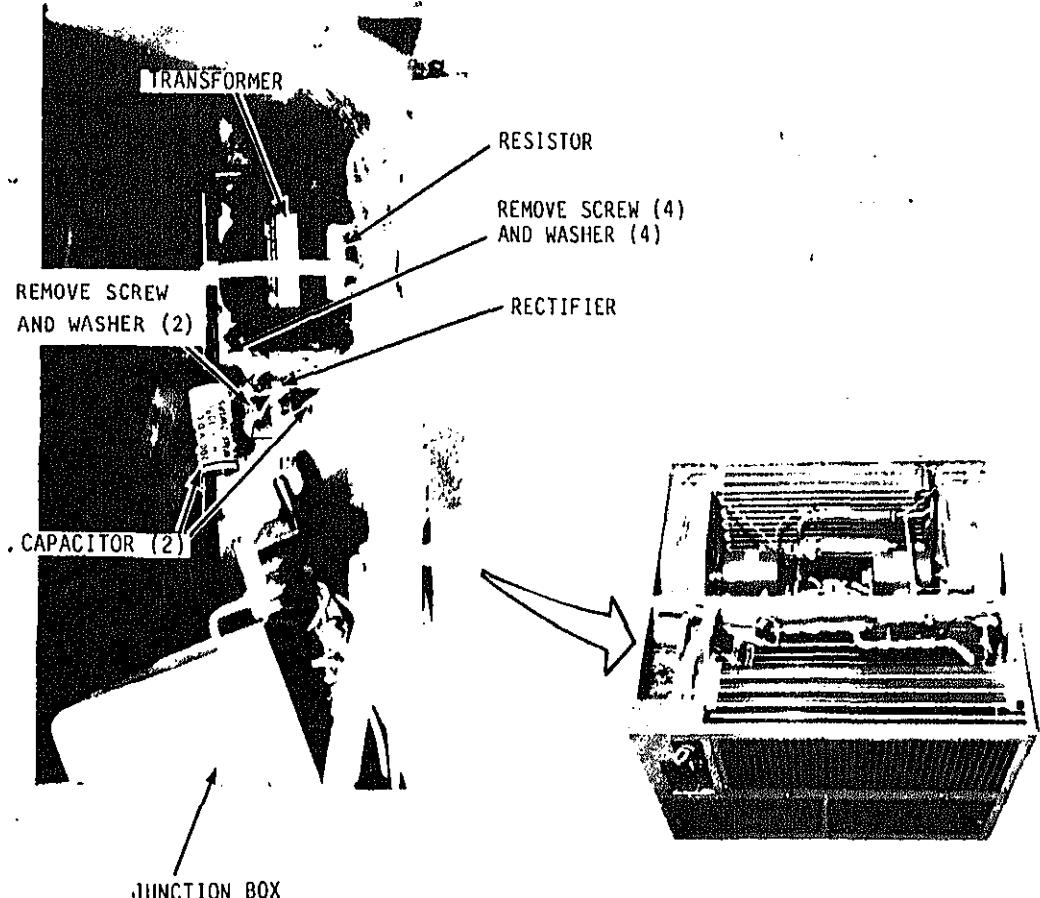


figure 4-17. Transformer, resistor, rectifier and capacitors, removal and installation

gns of overheating. Replace if  
orched or blistered, or if case is  
maged.

(2) Using the ohms function of a  
ltimeter, measure the resistance be-  
een the + and - terminals of the rec-  
fier:

(a) With the + lead of the meter  
the - terminal of the rectifier and  
e - lead of the meter on the + termi-  
l of the rectifier, conductivity  
ould be indicated.

(b) Reverse the meter leads to  
e rectifier; meter should indicate an  
en circuit (infinity).

(c) Replace rectifier if measure-  
nts differ from those given in (a) and  
(b).

(3) Using multimeter, test capaci-  
or for continuity. Replace capacitor  
continuity exists.

#### d. Installation.

(1) Refer to figure 4-17 and in-  
all rectifier.

(2) Refer to figure 1-5 and in-  
all capacitors by crimping leads into  
ble terminals.

(3) Refer to figure 1-5 and attach  
able to rectifier.

(4) Refer to figure 4-10 and in-  
all the junction box.

### -30. Heating Elements and Heater Cut- it Switch.

a. General. A bank of six elements  
rovides heat for the heating mode;  
three elements are energized in the LOW  
nd all six in the HIGH heat position.  
emperature is controlled by thermo-  
atic cycling. Dangerously high tem-  
ratures are prevented by the heater  
utout switch.

#### b. Removal.

(1) Refer to figure 4-4 and remove  
op front cover.

(3) Refer to figure 4-18 and re-  
move the heating elements or the hea-  
cutout switch.

c. Testing. Refer to wiring dia-  
(figure 1-5) and test across the heat-  
element leads for continuity, using  
multimeter. If no continuity exists  
replace the heating element. Using  
multimeter, test the heater cutout  
switch for continuity between termin-  
1 and 2 (also between terminals 3 and  
4). If no continuity exists, replace  
the heater cutout switch.

#### d. Installation.

(1) Refer to figure 4-18 and in-  
stall the heating element or heater  
cutout switch.

(2) Refer to figure 4-10 and in-  
stall the junction box and control  
ule.

(3) Refer to figure 4-4 and in-  
stall the top front cover.

### 4-31. Thermostatic Switch.

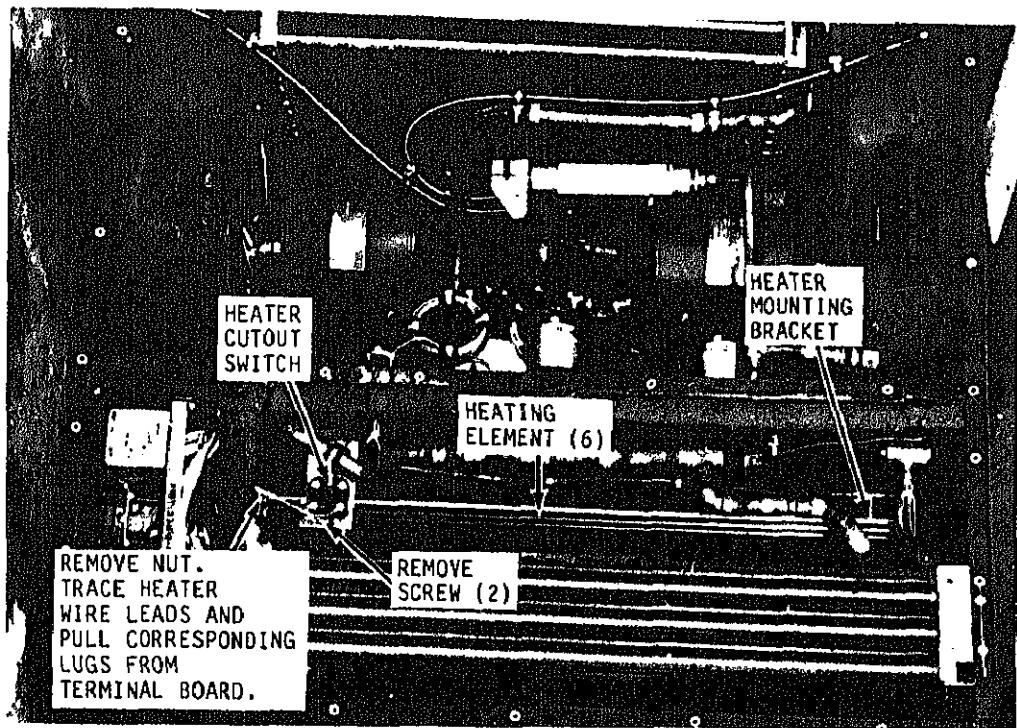
a. General. The thermostatic switch  
automatically changes the condenser fan  
speed by sensing ambient temperature.  
With the ambient temperature at 95°F  
(35°C) or below, the condenser fan will  
run at low speed. If the ambient tem-  
perature rises to approximately 105°F  
(40.6°C), the condenser fan will run  
high speed. Conversely, if the fan is  
running at high speed and the ambient  
temperature drops to approximately 95°F (35°C),  
fan will run at low speed.

b. Testing. If no speed change  
noted (change in noise level) during  
operation, when the ambient tempera-  
ture change as described in paragraph a.  
above, the switch is defective and  
be replaced.

#### c. Removal.

(1) Refer to figure 4-4 and re-  
move top front cover.

(2) Refer to figure 4-19 and  
move thermostatic switch.



#### TO REMOVE HEATING ELEMENT:

GRIP HEATING ELEMENT FITTING FLANGE WITH WRENCH PLIERS, AND WITH END WRENCH, REMOVE LOCKNUT AND WASHERS. SLIDE ELEMENT FREE OF HOUSING PANEL, THEN OUT OF MOUNTING BRACKET. START WITH TOP ELEMENT AND WORK DOWN.

Figure 4-18. Heating element and heater cutout switch, removal and installation.

#### Installation

- 1) Refer to figure 4-19 and install the thermostatic switch.
- 2) Refer to figure 4-4 and install the top front cover.

#### Wiring.

Inspection. Inspect insulation for cracks and signs of deterioration. Particular attention to wires passing through holes in the frame and over metal edges. If inspection reveals a broken or cut wire, and the wire is exposed, it must be repaired. If the wire is in the wiring harness or in an inaccessible area, replace the wire (c. below).

ness or in an inaccessible area, replace the wire (c. below).

b. Testing. Test a wire for continuity by disconnecting each end from the component(s) to which it is connected. Touch the test probes of a multimeter to the ends of the wire to test. If continuity is not indicated, the wire is defective and must be repaired or replaced.

c. Replacement. To replace a defective wire lead, disconnect both ends of the components and install new wire, an exact duplicate of wire being replaced. If the defective wire is difficult to remove from wiring harness,

the wire back from the components about two inches and cover ends to outside of harness with electrical tape or plastic clamps.

**4-33. High Pressure Cutout Switch and Low Pressure Cutout Switch.**

a. General. The high pressure cut-out (HPCO) switch prevents the compressor from operating if the discharge pressure exceeds  $445 +10$  psig. The low pressure cutout (LPCO) switch prevents the compressor from operating if the suction pressure drops below  $15 +5$  psig. Each is reset manually. Inspect and

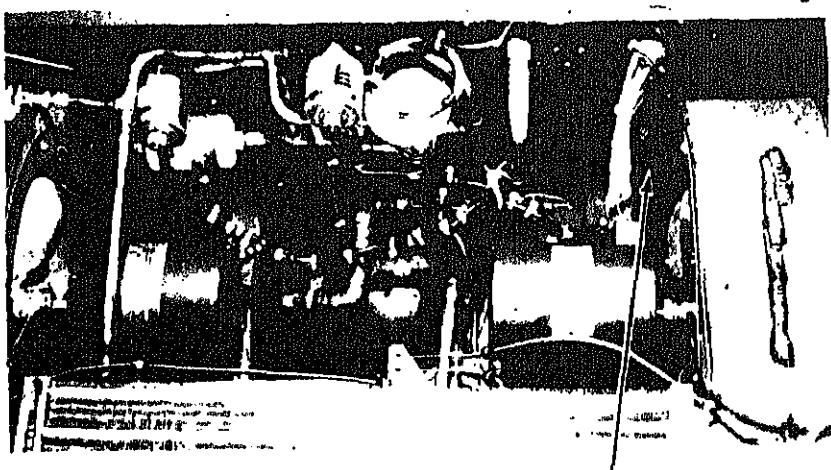
test the HPCO and LPCO switch. If the compressor fails to operate after the switch is reset.

**b. Inspection.**

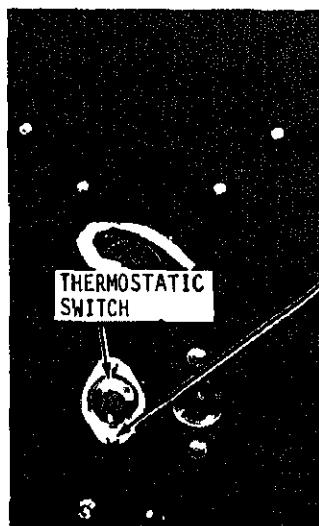
(1) Refer to figure 4-20 and move the access cover.

(2) Inspect for broken or wire leads and kinked or broken lary tubes.

c. Testing. (See WARNING front cover.



1. DISCONNECT CABLE CONNECTOR (2ND FROM BOTTOM)



2. REMOVE SCREW (2) AND WASHER (2)

3. REMOVE SWITCH AND ATTACHED CABLE THRU HOLE IN REAR OF AIR CONDITIONER

Figure 4-19. Thermostatic switch removal and installation

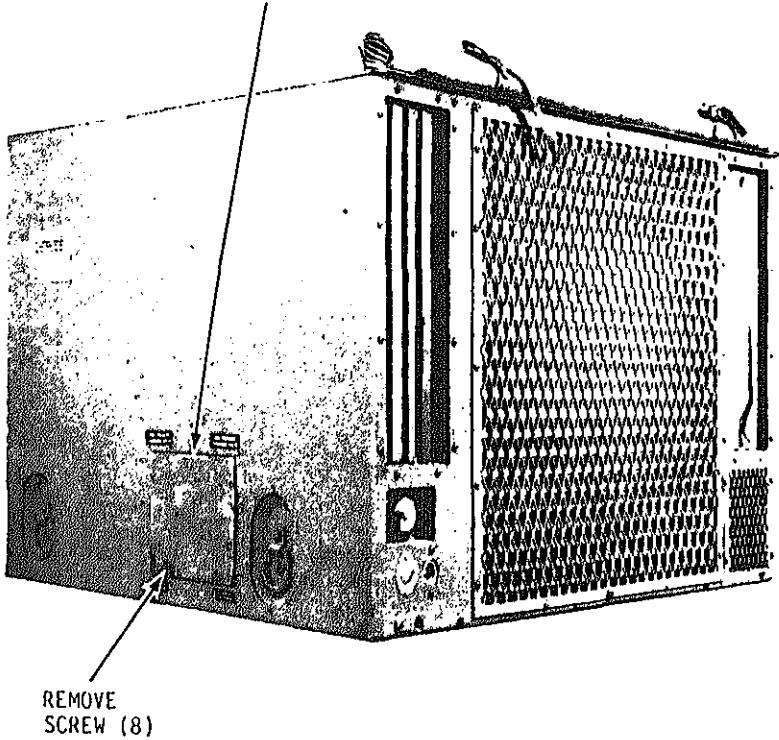


Figure 4-20. Access to pressure cutout switches

(1) Using a multimeter, test for continuity between terminals 1 and 2 of each pressure cutout switch.

(2) If continuity is not indicated, the pressure cutout switch is defective and must be replaced. Report to direct support maintenance for replacement of defective switch.

#### 4-34. Compressor (See WARNING inside front cover.)

a. General. The compressor is a hermetically sealed unit and is not repairable. An inoperative compressor is usually due to a mechanical failure causing the compressor to freeze, a control failure, or motor burnout. Compressor replacement is required in all cases of mechanical or motor burnout. If the motor is defective report to direct or general support maintenance.

#### b. Test.

(1) Refer to figure 4-4 and remove the condenser cover and top rear cover.

(2) Refer to figure 4-9 and remove condenser fan motor and the compressor electrical junction box.

(3) Disconnect receptacle connector from compressor junction box and move junction box cover.

(4) Refer to wiring diagram (figure 1-5) and test for continuity using multimeter. Lack of continuity indicates an open winding.

(5) Place one contact of the multimeter against the compressor housing and the other against the motor terminals, one at a time. If a circuit is indicated the motor is grounded.

#### 4-35. Condensate Water Drain Tube

a. General. Refer to paragraph 2-4c(2).

#### b. Removal.

(1) Refer to figure 4-1 and the evaporator inlet louver.

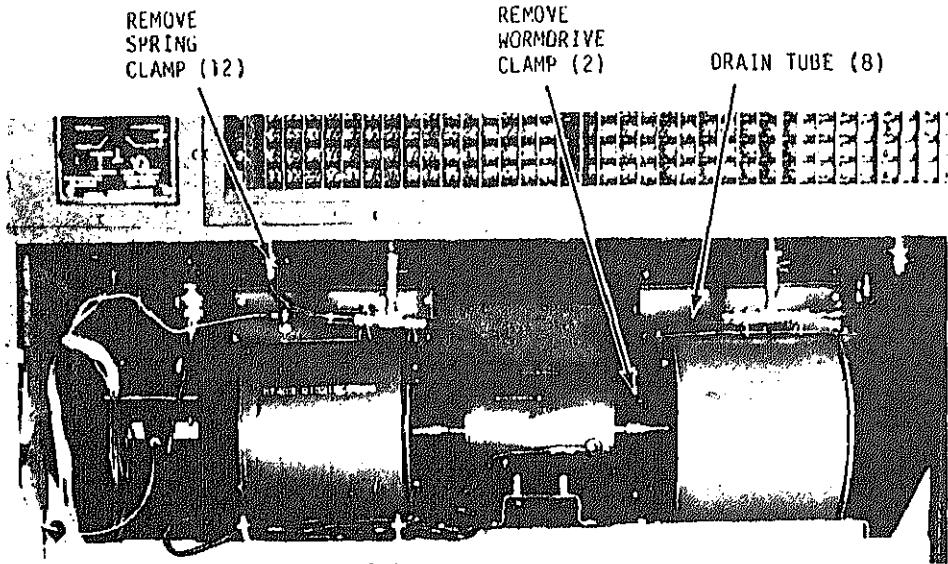


Figure 4-21. Drain tubes, removal and installation

(2) Refer to figure 4-21 and remove clamps which hold plastic drain tubes to fittings.

#### c. Inspection and Servicing.

(1) Inspect tubes for cracks, obstructions and loose connections.

(2) Clean tubes with low pressure compressed air or flush with water.

#### d. Installation.

(1) Refer to figure 4-21 and replace tubes and clamp securely.

(2) Refer to figure 4-1 and replace the evaporator inlet louver.

### -36. Liquid Line Solenoid Valve, L1

a. General. The normally-open liquid line solenoid valve is electrically closed when the mode selector switch is turned to COOL. When the temperature control thermostat is satisfied, the liquid line solenoid valve opens placing the refrigerant system in the bypass condition.

b. Inspection (See WARNING inside front cover)

(1) Refer to figure 4-4 and remove rear top cover.

(2) Refer to figure 6-3 and remove nut from valve.

(3) Remove valve cover and inspect coil for cracks, breaks, loose connections, frayed wires or other defects.

(4) Report any defects to direct support maintenance.

c. Test. Using a multimeter, test across the valve coil leads for continuity. If no continuity is indicated the coil may be defective. Report to direct support maintenance.

### -37. Pressure Equalizing Solenoid Valve, L2

a. General. The normally-open pressure equalizing solenoid valve is electrically closed when the mode selector switch is turned to COOL. When power is switched from the solenoid coil the valve opens equalizing the high side to low side pressure.

... for cracks, breaks, loose connections, frayed wires or other defects.

(3) During the cooling cycle, inspect the compressor suction line. If feels hot, the pressure equalizing solenoid valve (figure 5-7) is defective.

(4) Report all defects to direct support maintenance.

. Test. Test the pressure equalizing solenoid valve for continuity across electrical leads with a multimeter. If continuity is indicated, the valve is defective and should be replaced. Report all defects to direct support maintenance.

fects.

b. Inspection.

(1) Refer to figure 4-4 and remove top front cover.

(2) Refer to figure 4-22 and para 5-29c(4) and check that the required length of the expansion valve's sensing bulb is fully in the suction line bulb well.

(3) Refer to figure 4-22 and examine the flow restrictor capillary tube carefully. They should be very cold and evenly frosted. Unfrosted tubes are blocked and should be re-placed.

(4) If none of the capillary tube is cold and frosted, the valve is

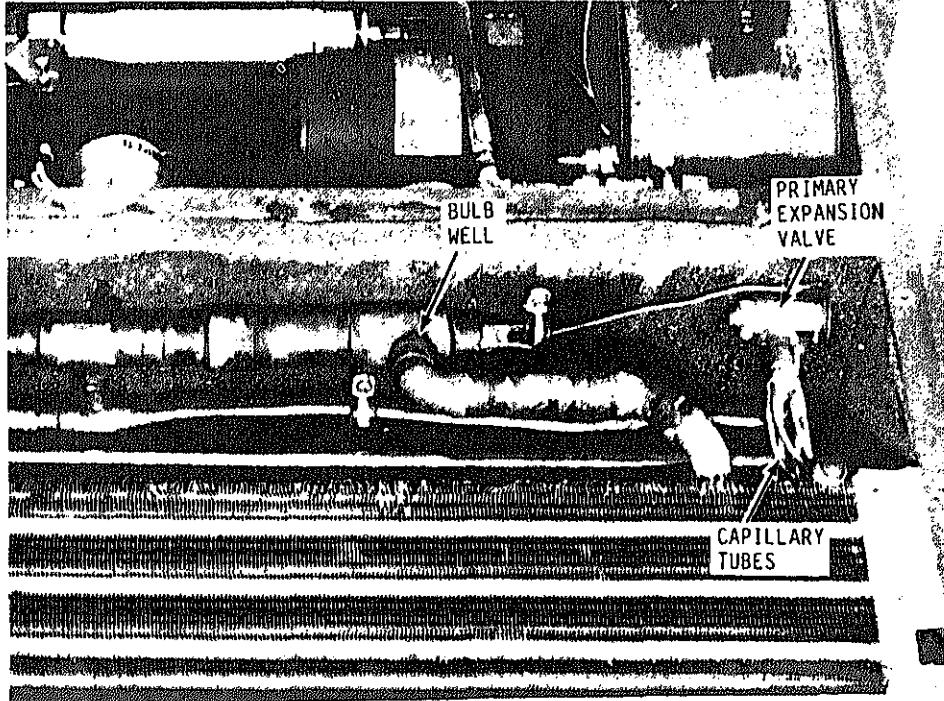


Figure 4-22. Expansion valve, primary

blocked or the valve's power assembly is ruptured. The test for the power assembly is listed in the following paragraph (c).

c. Test. Test the power assembly by removing the valve's sensing bulb from the suction bulb well (figure 4-22). Hold the sensing bulb firmly in both hands for two or three minutes. The warmth from holding the bulb should put enough pressure on the bellows to start the refrigerant flowing into the system. If cooling does not commence, the expansion valve is defective and should be replaced. Report all defects to direct support maintenance.

#### 4-39. Vent Damper Actuator.

##### a. Removal.

(1) Refer to figure 4-1 and remove the evaporator inlet louver.

(2) Refer to figure 4-23 and disassemble the vent damper actuator and control assembly as follows:

(a) Loosen the set

(b) Remove the actuator bracket by removing one screw and three washers.

(c) Raise the actuator from the low

(d) Remove the screw from the bracket on the vent door

(e) Remove inner control assembly.

(f) Remove outer control assembly.

(g) Remove control cable.

##### b. Installation.

(1) Refer to figure 4-23 and install the vent actuator as follows:

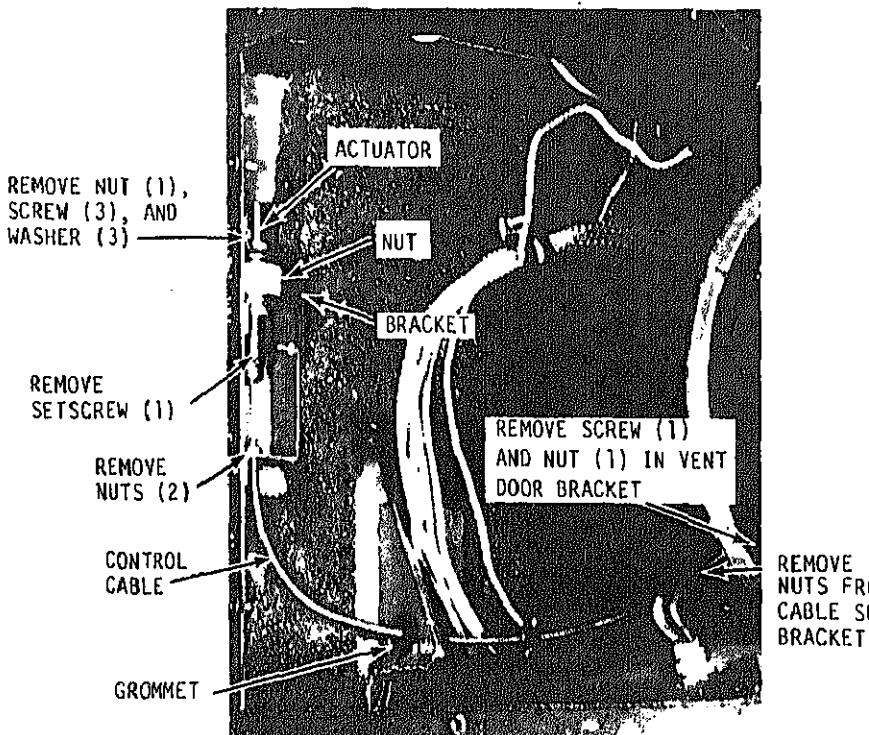


Figure 4-23. Vent damper actuator removal and installation.

vent door.

(e) Lubricate the threads on the actuator, install actuator and actuator nut in the fixed actuator bracket, then install the removable bracket. Ensure that bushings are in both brackets with

actuator.

c. Tighten the actuator onto the cable.

(3) Refer to figure 4-1 and the evaporator inlet louver.



## CHAPTER 5

### DIRECT SUPPORT AND GENERAL SUPPORT

#### MAINTENANCE INSTRUCTIONS

##### Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

###### . Tools and Equipment.

No tools or equipment are issued with air conditioner.

###### 5-3. Maintenance Repair Parts.

###### . Special Tools and Equipment.

No special tools or equipment are required for maintenance of the air conditioner.

Repair parts and equipment are listed and illustrated in the repair parts and special tool list covering direct and general support maintenance for this equipment.

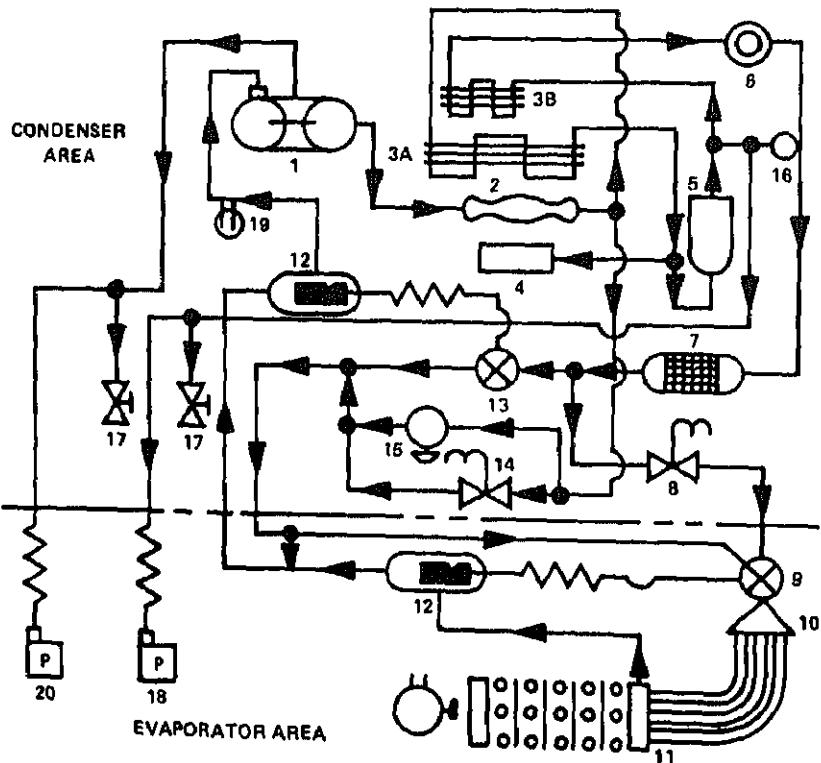
##### Section II. TROUBLESHOOTING

###### . General.

This section provides information useful in diagnosing and correcting satisfactory operation or failure of air conditioner or any of its components. Electrical schematic and wiring diagrams shown in figures 1-4 and will be helpful for checking electrical circuits. A refrigerant flow diagram is shown in figure 5-1. System

pressure test instructions are in paragraph 6-2. Troubleshooting procedures for direct and general support maintenance are listed in table 5-1. Each trouble symptom or malfunction stated is followed by a step-by-step procedure for inspecting and testing the system to determine the specific cause of fault or failure. The corrective action recommended follows the determination of probable cause.

FIND NO.	PART NO.	QTY	NOMENCLATURE
1	D13216E6306	1	COMPRESSOR
2	C13216E8187	1	HOSE ASSEMBLY, METAL
3A	D13216E6284	1	COIL, CONDENSER
3B	PT OF FIND NO. 3A	1	SUBCOOLER
4	D13216E6330	1	CYLINDER ASSY, ACTUATING, LINEAR
5	D13216E6356	1	RECEIVER, LIQUID REFRIGERANT
6	C13214E3969	1	INDICATOR, SIGHT, LIQUID
7	C13216E5918-2	1	DEHYDRATOR, DESICCANT, REFRIGERANT
8	C13216E6172-3	1	SOLENOID VALVE, WITH LEADS (L1)
9	C13216E6160-3	1	VALVE, EXPANSION (PRIMARY)
10	C13216E6345	1	RESTRICTOR, FLUID FLOW
11	D13216E6283	1	COIL, EVAPORATOR
12	C13216E6344	2	BULB WELL
13	C13216E6174-3	1	VALVE, EXPANSION (QUENCH)
14	C13216E6172-4	1	SOLENOID VALVE, WITH LEADS (L2)
15	C13216E6362-1	1	REGULATOR, FLUID PRESSURE
16	B13211E8369	1	VALVE, PRESSURE RELIEF
17	C13216E9499-1	2	VALVE CHARGING
18	C13216E6215-3	1	SWITCH, PRESSURE (HIGH)
19	C13216E7546	1	ACCUMULATOR
20	C13216E6215-1	1	SWITCH PRESSURE (LOW)



TEST OR INSPECTION  
CORRECTIVE ACTION

1. COMPRESSOR WILL NOT START

- Step 1. Test for an open-circuit condition in the control circuit of a continuity check.  
Replace component or wire causing open circuit (para 4-32).
- Step 2. Test circuit breaker for defective operation.  
Replace defective circuit breaker (para 4-26).
- Step 3. Check to see if high or low pressure cutout switch is defective.  
Replace defective switch (para 5-22).
- Step 4. Check to see if compressor motor or thermal protectors are defective.  
Replace compressor (para 5-16).

2. COMPRESSOR STARTS BUT IMMEDIATELY STOPS

- Step 1. Check to see if thermal protector or circuit breaker is tripped.  
Reset circuit breaker, or allow thermal protector to cool and reset. If condition repeats, replace compressor (para 5-16).

3. LITTLE OR NO HEATING CAPACITY.

- Step 1. Check for loose electrical connections or faulty wiring.  
Repair or replace wiring as necessary (para 4-32).
- Step 2. Test mode selector switch and temperature selector for faulty contact closure in heat control circuit.  
Replace defective switch (para 4-23).
- Step 3. Test heater relay for faulty contact closure.  
Replace defective relay (para 4-27).
- Step 4. Test for defective operation of heater high temperature cutout switch.  
Replace defective thermostat switch (para 4-30).
- Step 5. Test heater for open-circuited element.  
Replace defective heaters (para 4-30).

4. INSUFFICIENT COOLING

- Step 1. Test for low refrigerant charge.  
Add refrigerant (figure 6-3).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

4. INSUFFICIENT COOLING - Continued

Step 2. Check for indications of a clogged dehydrator.

Replace clogged dehydrator (para 5-24).

Step 3. Check for indications of a defective pressure regulator valve.

Replace defective valve (para 5-30).

Step 4. Check for indications of air in system.

Purge and charge system (fig. 6-1 and 6-2).

Step 5. Check for indications of a defective thermal expansion valve.

Replace defective valve (para 5-28).

Step 6. Check for indications of defective solenoid valve.

Replace defective solenoid valve (para 5-25).

Step 7. Check for indications of defective quench valve.

Replace defective valve (para 5-29).

5. LOW SUCTION PRESSURE (See Table 6-1)

Step 1. Check for indications of a clogged dehydrator.

Replace clogged dehydrator (para 5-24).

Step 2. Check for indications of a defective thermal expansion valve.

Replace defective valve (para 5-28).

Step 3. Check for indications of a defective quench valve.

Replace defective valve (para 5-29).

6. LOW DISCHARGE PRESSURE (See Table 6-1)

Step 1. Check to see if compressor is not pumping due to defect.

Step 2. Check to see if HIGH/LOW condenser fan thermostatic switch is defective.

Replace defective switch (para 4-26).

7. LOW SUCTION AND DISCHARGE PRESSURE (See Table 6-1)

Step 1. Check for low refrigerant charge by inspecting sight glass for bubbles or milky appearances. Also check system for leaks.

Repair leaks and add refrigerant as necessary.

CTION

TEST OR INSPECTION

CORRECTIVE ACTION

W SUCTION AND DISCHARGE PRESSURE - Continued

Step 2. Check for indications of defective thermal expansion valve.

Replace valve (para 5-28).

Step 3. Check for indications of defective quench valve.

Replace valve (para 5-29).

GH SUCTION PRESSURE (See Table 6-1)

Step 1. Check for indications of defective thermal expansion valve.

Replace valve (para 5-28).

Step 2. Check for indications of defective quench valve.

Replace valve (para 5-29).

IGH HEAD PRESSURE (See Table 6-1)

Step 1. Check to see if condenser coil is dirty.

Clean coil.

Step 2. Check condenser coil temperature gradient for indications of refrigerant overcharge.

Discharge refrigerant (fig. 6-1) while observing head pressure and sight glass.

Step 3. Inspect or test condenser fan motor for defective operation.

Repair motor (para 6-8).

Step 4. Inspect condenser louvers and actuating mechanism for correct adjustment and proper operation.

Adjust and clean as necessary. Replace inoperative components (para 5-20).

Step 5. Check for indications of defective quench valve.

Replace defective valve (para 5-29).

Step 6. Check to see if the compressor is defective.

Replace defective compressor (para 5-16).

### Section III. GENERAL MAINTENANCE INSTRUCTIONS

#### 5. General.

This section contains general servicing instructions that otherwise would have to be repeated several times in this manual.

#### 6. Testing for Leaks.

The air conditioner can be tested for refrigerant leaks by the use of an electronic leak detector, by the halide test or by the soap bubble method. The preferred method is use of the electronic leak detector. If sufficient pressure is not present in the system to accomplish an adequate leak test, add dry nitrogen at the receiver charging valve to increase the system pressure to 300 psig, then conduct the leak test. If the system is totally discharged, to conserve leak test refrigerant, pressurize the system with R-12 to 72 psig, isolate the compressor by front-seating the service valves (1 and 2, figure 2). At the receiver charging valve pressurize the system with dry nitrogen to 300 psig, then conduct the leak test.

(1) By Electronic Leak Detector. Using a G.E. Type H-2 Leak Detector, or equivalent, proceed as follows:

(a) Turn on and calibrate the leak detector as described in the instructions supplied with the instrument.

(b) Slowly pass the detector probe tip over the sweat fittings, mechanical couplings and valves in the refrigerant circuit. If refrigerant is leaking, detector will provide a visible or audible signal.

(c) Use the soap-bubble method to localize the leak to a defective component or connection.

(2) By Halide Leak Test. Using a propane flame halide leak detector, proceed as follows.

(a) Slowly pass the exploring probe on the torch over the sweat fittings, mechanical couplings and valves. If refrigerant is leaking, the flame will be affected as follows:

Small leak -- flame changes from blue to green

Large leak -- flame changes from blue to dense blue with reddish tip

Massive leak - may extinguish flame

(b) Use the soap-bubble method to localize the leak to a defective component or connection.

(3) By Soap Solution Method. Use either a prepared bubble-type leak detector compound or a solution of hand soap in water, proceed as follows.

(a) Apply the solution to all points of possible leakage, and watch for bubble formation indicating a refrigerant leak.

#### NOTE

Allow solution to remain on joints long enough for small leaks to form noticeable bubbles.

(b) Wipe solution from joints to mark spots where leakage is observed.

#### 5-7. Refrigeration System.

a. Opening System. When the refrigeration system must undergo maintenance that requires the system to be opened for removal of parts, the system must first be discharged (para 6-3). After the repair has been made and all sealing completed, the system must be tested for leaks and charged (para 6-3).

b. Removal of Parts. When the refrigeration system must undergo maintenance that requires the refrigeration system to be opened for removal of parts, the system must first be discharged and purged (figure 6-1). After the repair has been made and all sealing completed, the system must be tested for leaks and charged (para 6-3). Except for flare nut connection, all tubing attachments in the refrigeration system are "sweat-joints" which are opened by heating with a brazing torch. During unsweating, shield the wiring insulation, painted metal, and valves from the heat of the torch. Use we

ths to protect the gas charge in expansion valve bulbs and capillary tub-

## WARNING

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.
2. Certain brazing operations may require mechanical ventilation.
3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.  
c. Brazing. Braze copper-to-copper joints with silver solder type 3, 4 or specification QQ-S-561 and copper-to-brass or copper-to-steel with type 4 or specification QQ-S-561 per MIL-B-233. Solder melting point is 1160°F (625°C). All brazed or soldered joints will be made with an atmosphere of inert gas to prevent internal oxidation.

### 8. Insulation and Gaskets.

Replace damaged insulation and gaskets. Cement loose insulation.

### 9. Hardware.

Replace any damaged screws, washers, lockwashers or nuts. Use screws of correct length to hold parts securely. In some applications screws that are too long may hit bottom before the head is tight against part it is to hold or may cause damage to the threads or other parts.

### 10. Shims.

Be sure to remove all shims where used. Keep shims together and identify them as to location.

## Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND ASSEMBLIES

### 16. General. (See WARNING inside front cover.)

This section covers removal of all major assemblies of the air conditioner which are the responsibility of the dir-

### 5-11. Repairing Damaged Threads.

Damaged threads should be repaired by use of a thread restorer or by chasing in a lathe. Internal threads should be repaired with a tap of the correct size. If threads cannot be satisfactorily repaired, replace the part. Drill out and replace blind rivet nuts having defective threads.

### 5-12. Repair of Damaged Machined and Polished Surfaces.

Smooth rough spots, scores, burrs, gallling, and gouges from damaged machined and polished surfaces so that the part will efficiently perform its normal function. The finish of the repaired part is to approximate that of the original finish. In performing any of these operations, critical dimensions must not be altered.

### 5-13. Removal of Rust or Corrosion.

Remove corrosion from all parts of metal. To remove rust or corrosion use wire brush, abrasive cloth, sand blast, vapor blast equipment, or rust remover except on highly polished surfaces. On these surfaces, buffing or the use of crocus cloth is recommended.

### 5-14. Tubes and Fittings.

Check tubes and fittings for cracks or split condition. Check tubing for kinks. Replace defective fittings. Replace damaged tubing with tubing of correct size. Take care in making bends in tubing to prevent kinking of tubing. Tubing and fittings must be completely clean on inside prior to installation.

### 5-15. Valves.

Valves and other parts should be handled carefully to prevent damage. Capillary tubes must be handled very carefully to prevent kinking of the tubes.

ect support and general support maintenance. The refrigerant piping and valves cannot be removed as a unit, only those parts that require replacement should be removed. Removal and installation instructions for individual

valves and other components of the refrigeration system are contained in this section. Refer to paragraph 5-6 before performing maintenance on the refrigeration system.

### 5-17. Compressor.

a. General. The compressor is a self-contained hermetically sealed unit and cannot be repaired.

b. Removal. Refer to figure 5-2 and remove compressor as follows:

#### WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be

REMOVE COMPRESSOR  
MOUNTING BOLTS (4),  
WASHER (4), BUSHING (4)

made aware of the potential for aggravation rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove top covers.

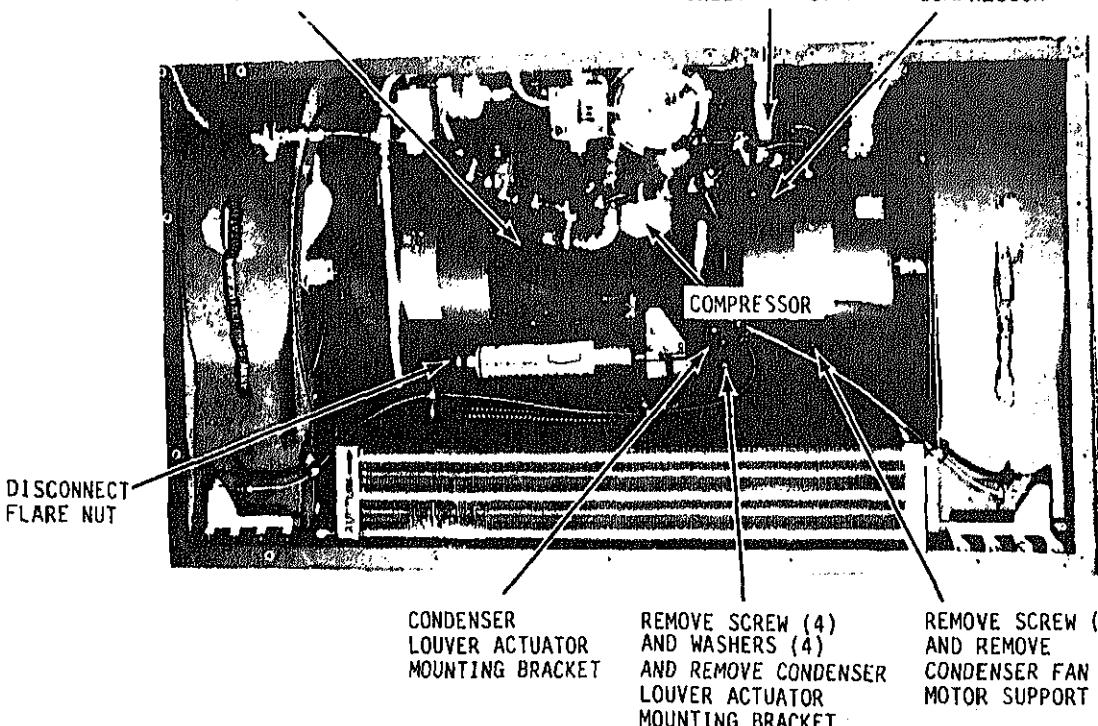
(3) Refer to figure 5-2 and disconnect condenser louver actuator bracket attached. Move aside without altering actuator adjustments.

(4) Refer to figure 4-9 and remove condenser fan motors and motor supports.

(5) Disconnect electrical connector P1 from compressor, also

UNSOLODE ALL  
PIPING AT  
COMPRESSOR  
INLET AND OUTLET

DISCONNECT ELECTRICAL  
CONNECTOR P6 FROM  
COMPRESSOR



removal of compressor.

(6) Remove four screws, washers, lock washers and compressor mount bushings.

(7) Lift compressor from air conditioner.

### CAUTION

If compressor is being replaced because of a motor burnout, decontaminate system as instructed in paragraph 6-5. Failure of the replacement compressor will result if all the contaminants are not removed.

c. Installation. Install compressor follows:

(1) Refer to figure 5-2, place compressor on mounts and install four compressor mount bushings. Secure compressor with four screws, washers and lock washers.

(2) Connect compressor tubing. Refer to figure 5-7 and install dehydrator.

(3) Refer to paragraph 5-6a and leak-test connections.

(4) Connect electrical connector.

(5) Refer to figure 4-9 and install condenser motor and motor supports.

(6) Refer to figure 5-2 and install condenser louver actuator and mounting bracket.

(7) Refer to figure 6-1 and purge refrigerant system.

### WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(8) Refer to figure 6-2 and charge the refrigerant system.

(9) Refer to figure 4-4 and install top covers.

5-18. Evaporator Coil and Mist Eliminator Holder.

a. General. A portion of the evaporator coil mounting hardware is used to attach the mist eliminator holder. Therefore coil and mist eliminator holder are removed under the same procedure.

b. Removal. Remove the evaporator coil and mist eliminator holder as follows:

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove housing top covers.

(3) Refer to figure 4-1 and remove evaporator air outlet louvers and mist eliminator.

(4) Refer to para 4-30 and remove heating elements.

(5) Refer to figure 5-3 and remove support plate that holds coil housing.

(6) Refer to figure 5-3 and disconnect tubing from evaporator coil.

(7) Remove six screws, washers, lockwashers that hold evaporator coil and mist eliminator holders to air conditioner. Remove holders and coil.

c. Installation. Install evaporator coil and mist eliminator holder follows:

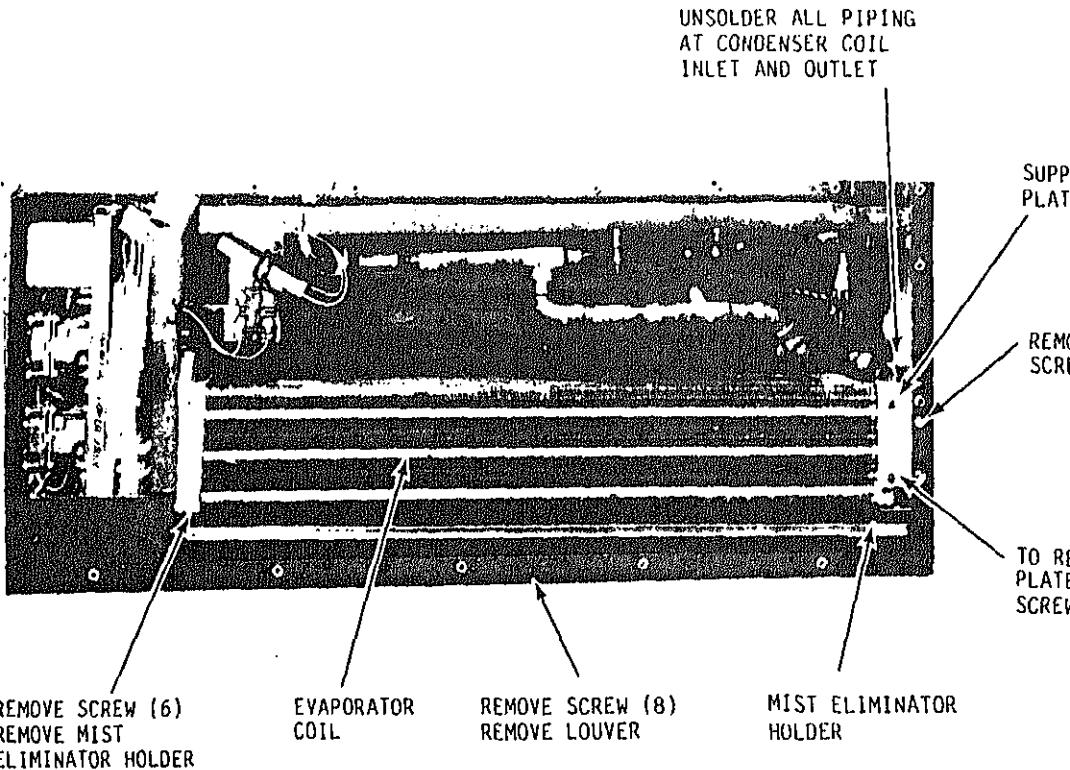


Figure 5-3. Evaporator coil and mist eliminator holder, removal and install.

(1) Install coil and mist eliminator holder in air conditioner and secure to brackets with six screws, washers, and lock washers. The upper four screws, washers and lockwashers attach both the coil and mist eliminator holder; the lower two hold the coil only.

### WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmia.

(2) Refer to figure 5-3 and install coil support plate.

(3) Connect tubing to coil. Leak test as described in 5-6.

(7) Refer to figure 6-1 and purge refrigerant system.

(8) Refer to figure 6-2 and charge refrigerant system.

Condenser Coil.

Removal. Remove condenser coil follows:

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing

cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove housing top covers.

(3) Refer to Figure 4-3 and remove condenser guard.

(4) Refer to figure 4-9 and remove power actuator, bracket and left condenser fan motor and supports.

(5) Disconnect tubing from condenser coil and remove other tubing at fittings as required.

UNSOLDER ALL PIPING  
FROM CONDENSER COIL  
INLET AND OUTLET

REMOVE MOTOR  
MOUNTING SCREW (4)  
REMOVE FAN ASSY

REMOVE SCREW (4)  
ON CONDENSER  
COIL FEET

CONDENSER  
COIL

REMOVE SCREW (20)  
REMOVE CONDENSER  
GUARD

(6) Remove screws that secure coil to base of housing.

(7) Remove coil from air conditioner. Use care when removing coil to prevent damage to coils and fins.

b. Installation. Install condenser coil as follows:

(1) Be sure sheet spring nuts are in place on bottom of coil. Position coil in air conditioner and install four countersunk-head screws from underside of housing.

(2) Connect tubing to condenser and attach actuator flare nut.

(3) Leak test as described in para -6.

(4) Refer to figure 4-3 and install condenser guard.

(5) Refer to figure 4-9 and install condenser fan motors and supports and actuator.

(6) Refer to figure 4-4 and install housing top covers.

(7) Refer to figure 6-1 and purge the refrigerant system.

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(8) Refer to figure 6-2 and the refrigerant system.

S-20. Condenser Louver Actuator and Control.

a. Removal. Remove actuator and push-pull control as follows:

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to 6-1 and discharge refrigerant system.

(2) Refer to figure 4-3 and remove housing covers.

(3) Refer to figure 5-5 and locate mechanical post screws at each end and loosen control wire.

(4) Remove screw, lockwasher and loop clamp.

(5) Remove push-pull control assembly clips at each end and remove push-pull control.

(6) Disconnect flare nut from actuator cylinder.

(7) Remove two nuts and lockwashers from bracket and remove actuator cylinder. If cylinder is to be replaced, remove rivets and retain push-pull control assembly brackets.

b. Installation. Install actuator cylinder and control as follows:

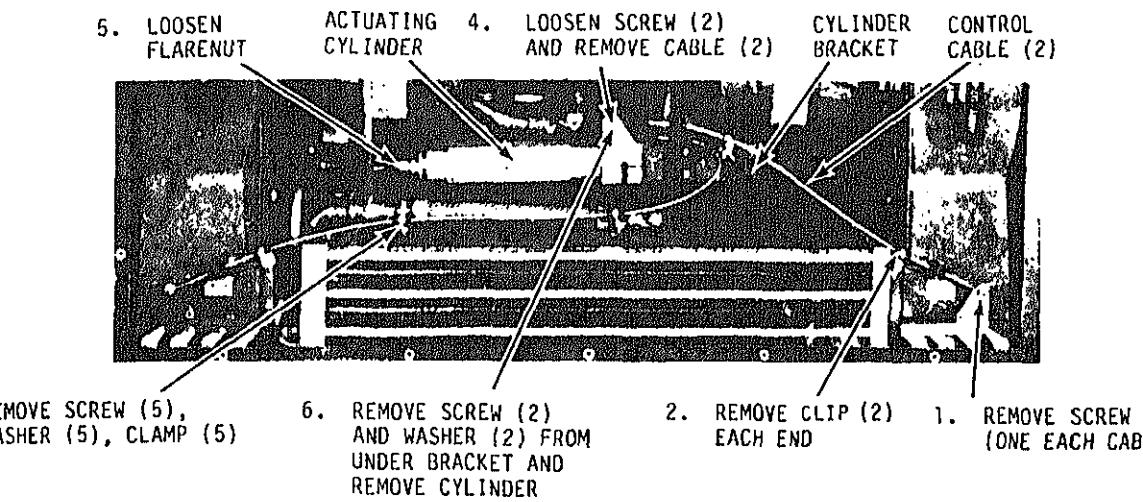


Figure 5-5. Condenser louver control, removal and installation

(1) Reinstall push-pull control assembly brackets on replacement cylinder.

face of the cylinder. Tighten the mechanical post screw.

(2) Install actuator cylinder (figure 5-5) with studs through openings in set. Install lockwashers and nuts uds.

(3) Refer to figure 4-4 and install housing top covers.

(3) Connect flare nut.

(4) Install push-pull control. outer control casing clips over and insert wire ends into openings mechanical posts on louver lever and tor cylinders.

### **WARNING**

(5) Install push-pull control clips ld control in position. Install clamp, screw, and lockwashers.

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

(6) Adjust control as described in low.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

Adjustment. Before system is ed, adjust louver push-pull control llows:

(1) Close louver blades and tighten in mechanical post to lock wire on end.

(2) Extend actuator rod until there 1/4 inch space between inner edge mechanical post bracket and the

(4) Refer to figure 6-2 and charg the refrigerant system.

1. Service Valves.

a. Removal.

(1) Refer to figure 4-20 and remove charging valve box access cover.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(2) Refer to figure 6-1 and discharge the refrigeration system.

(3) Refer to figure 5-6 and disconnect the service valve flare nuts.

(4) Remove four screws and pull charging valve box outward as allowed by the cutout switch wiring and capillary tubes. Take care not to damage the capillary tubes.

(5) Remove service valve by removing mounting screws on side of charging valve box.

**NOTE**

If new cap is installed on valve, remove keeper and chain to avoid chain contact with cutout switch terminals.

b. Installation.

(1) Refer to figure 5-6 and mount service valve in charging valve box.

(2) Place charging valve box in position and attach to housing.

(3) Attach refrigerant line flare nut to service valve.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(4) Refer to para 5-6 and leak the system.

(5) Refer to figure 6-1 and purge the refrigeration system.

(6) Refer to figure 6-2 and charge the refrigeration system.

(7) Refer to figure 4-20 and install charging valve box access cover.

5-22. High Pressure Cutout (HPCO) and Low Pressure Cutout (LPCO) Switches.

a. Removal.

(1) Refer to figure 4-20 and remove the charging valve box access cover.

## WARNING

. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities be-

fore working in environments where potential freon exposure may occur.

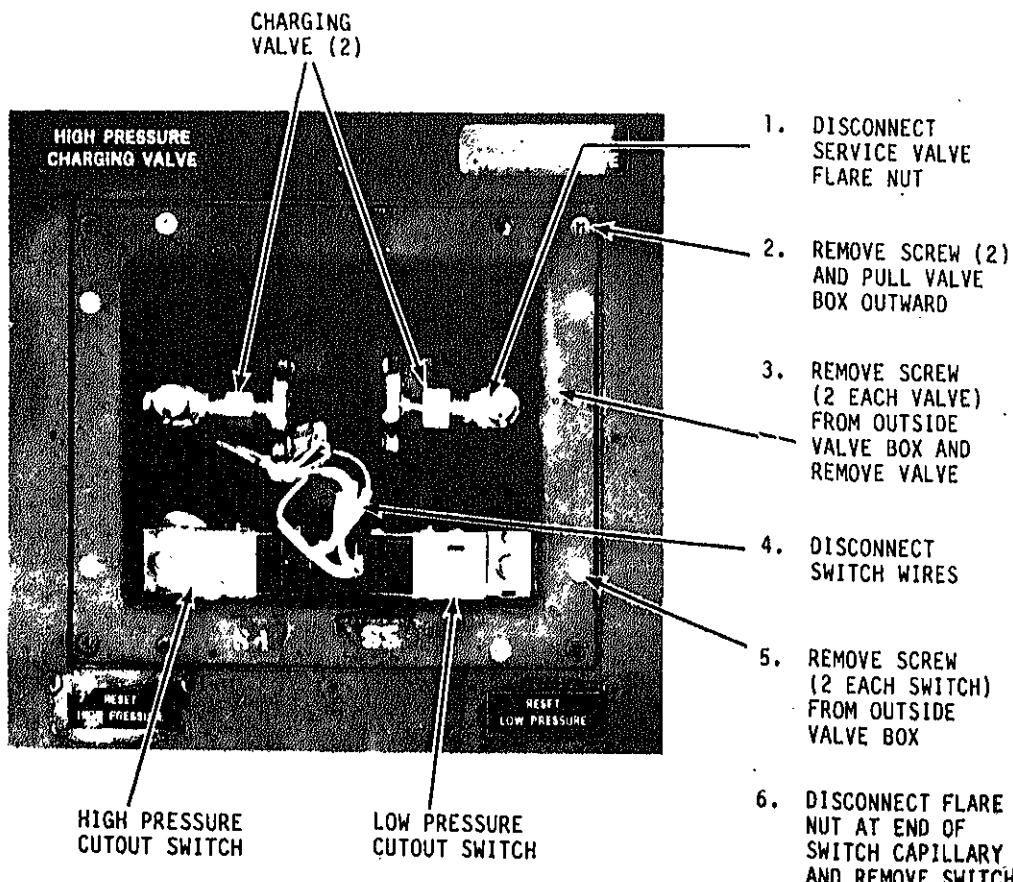
(2) Refer to figure 6-1 and discharge the refrigerant system.

(3) Refer to paragraph 5-21 and disconnect the service valve flare nuts.

(4) Remove four screws and pull charging valve box outward as allowed by wiring and capillary tubes. Take care not to damage the capillary tubes.

(5) Refer to figure 5-6 and disconnect the pressure cutout switch electrical leads.

(6) Remove pressure cutout switch mounting screws on side of charging valve box.



tch flare nut from the refrigerant tee.

(8) Remove the capillary tube grommet in the back wall of the charging valve box and extract the capillary tube flare nut through the opening.

b. Testing. Test the pressure cutout switch as described in paragraph 33.

c. Installation.

(1) Refer to figure 5-6 and install capillary tube and grommet in charging valve box.

(2) Mount pressure cutout switch to charging valve box.

(3) Attach pressure cutout switch and charging valve flare nuts to refrigeration lines.

(4) Refer to para 5-6 and leak test refrigeration system.

(5) Place charging valve box in position and attach to housing.

(6) Refer to wiring diagram (figure 1-5 or figure 1-6) and attach electrical leads to pressure cutout switch. Attach service valve flare nuts.

(7) Refer to figure 6-1 and purge refrigeration system.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by

before working in environments where potential freon exposure may occur.

(8) Refer to figure 6-2 and charge the refrigeration system.

(9) Refer to figure 4-20 and install charging valve box access cover.

5-23. Pressure Relief Valve.

a. General. In the event the refrigerant system pressure should exceed  $455 + 10$  psig, the pressure relief valve "pops off" to restore normal pressure to the system. It may happen, that having once opened, the pressure relief valve does not totally seal closed when no pressure is restored. In order not to constitute a continuous system leak, valve must be replaced.

b. Removal.

(1) Refer to figure 4-4 and remove front top cover.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(2) Refer to figure 6-1 and discharge the refrigeration system.

(3) Refer to figure 5-7 and remove the clamp around the pressure relief valve by removing the screw and washers that hold the clamp to the condenser housing.

(4) Unscrew the flare nut and re-the pressure relief valve.

### Installation.

(1) Refer to figure 5-7 and in-1 the pressure relief valve by fast-g the refrigerant circuit flare nut he pressure relief valve.

(2) Using the screw and washer re-d in 5-23a(3), install the clamp fastens the pressure relief valve he condenser fan housing.

### **WARNING**

1. Caution should be exer-cised with fluorocarbon re-frigerant gas (freons) as they can displace oxygen and there-by cause suffocation.

REMOVE SCREW (1),  
WASHER (1), CLAMP (1),  
DISCONNECT FLARE  
NUT AND REMOVE  
PRESSURE RELIEF  
VALVE

REMOVE SCREW (4),  
WASHER (4), CLAMP (2),  
PLATE (1), SPACER (4),  
DISCONNECT FLARE  
NUT (2) AND REMOVE  
DEHYDRATOR

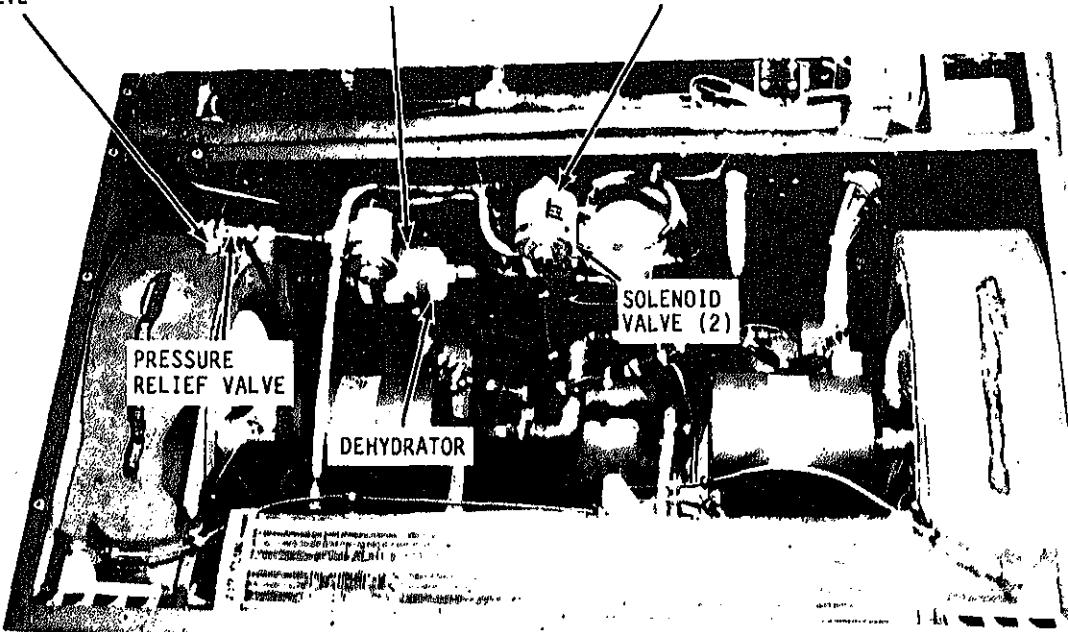
2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(3) Refer to para 5-6 and leak the refrigeration system.

(4) Refer to figure 6-1 and pur- the refrigeration system.

(5) Refer to figure 6-2 and cha- the refrigeration system.

REMOVE NUT (1) AND  
REMOVE SOLENOID COIL.  
UNSOLDER PIPING.  
REMOVE SCREW (2),  
WASHER (2) AND  
REMOVE SOLENOID VALVE.



(6) Refer to figure 4-4 and install top front cover.

#### 4. Dehydrator.

a. General. The dehydrator (filterer) is to be replaced whenever the refrigeration system is opened for maintenance.

### WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

#### b. Removal.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove housing rear top cover.

(3) Refer to figure 5-7 and remove screws, washers and dehydrator clamps.

(4) Unscrew flare nuts and remove dehydrator.

#### c. Installation.

(1) Refer to figure 5-7 and connect dehydrator to refrigerant system piping by tightening flare nuts. Use sealing compound on screw threads.

(2) Attach clamps to dehydrator

(3) Refer to para 5-6 and leak test the refrigeration system.

(4) Refer to figure 6-1 and purge the refrigeration system.

(5) Refer to figure 4-4 and install housing rear top cover.

### WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(6) Refer to figure 6-2 and recharge the refrigerant system.

#### 5-25. Liquid Line and Pressure Equalizing Solenoid Valves L1 and L2

a. General. L1 and L2 are electrically-operated valves, which close when electrical power is applied to the solenoid coils. Both are alike, only the usage is different. L2 which operates when the air conditioner is switched to the cooling mode, allows low side and high side pressures to equalize. When the air in the conditioned space has lowered to the thermostat (S8) setting, L1 opens allowing refrigerant to bypass the expansion valve thereby discontinuing cooling without shutting down the compressor.

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove covers.

(3) Refer to figure 5-7 and remove solenoid cover and coil as described in paragraph 4-34.

(4) Remove two solenoid valve mounting screws.

(5) Unsolder solenoid valve from piping.

### c. Installation.

(1) Refer to figure 5-7 and mount solenoid on compartment wall.

## **WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

personnel should be queried if doubt exists as to rod composition or ventilation requirements.

(2) Refer to paragraph 5-6 and solder solenoid valve to refrigerant system tubing.

(3) Install coil and cover on solenoid valve.

(4) Refer to para 5-6 and leak the refrigeration system.

(5) Refer to figure 6-1 and purge the refrigeration system.

(6) Refer to figure 4-4 and install top covers.

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(7) Refer to figure 6-2 and charge refrigerant system.

### 5-26. Receiver.

a. General. The receiver is located below the left side (counterclockwise rotating) condenser fan motor. To gain access to the receiver, the motor and its mounting bracket must be removed.

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove rear top cover.

(3) Refer to figure 4-9 and remove counterclockwise rotation condenser fan assembly and mounting bracket.

(4) Refer to figure 5-8 and remove receiver mounting bracket.

(5) Unsolder receiver from refrigeration system tubing.

### c. Installation.

(1) Refer to figure 5-8 and mount receiver on compartment wall.

## **WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

3. Local preventive medicine personnel should be queried if

doubt exists as to rod composition or ventilation requirements.

(2) Refer to paragraph 5 solder receiver to refrigerant tubing.

### **NOTE**

Curved end of tube installed in top at receiver enters length sufficient for tip of tube to face inner wall of receiver.

(3) Refer to paragraph 5 leak test the refrigeration system.

(4) Refer to figure 4-9 stall condenser fan assembly.

(5) Refer to figure 4-4 stall rear top cover.

## **WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(6) Refer to figure 6-1 the refrigeration system.

(7) Refer to figure 6-2 refrigeration system.

5-27. Accumulator

a. General. Refer to 5.26

b. Removal

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing

cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove rear top cover.

NOTE: CONDENSER FAN AND MOTOR REMOVED TO SHOW RECEIVER AND ACCUMULATOR

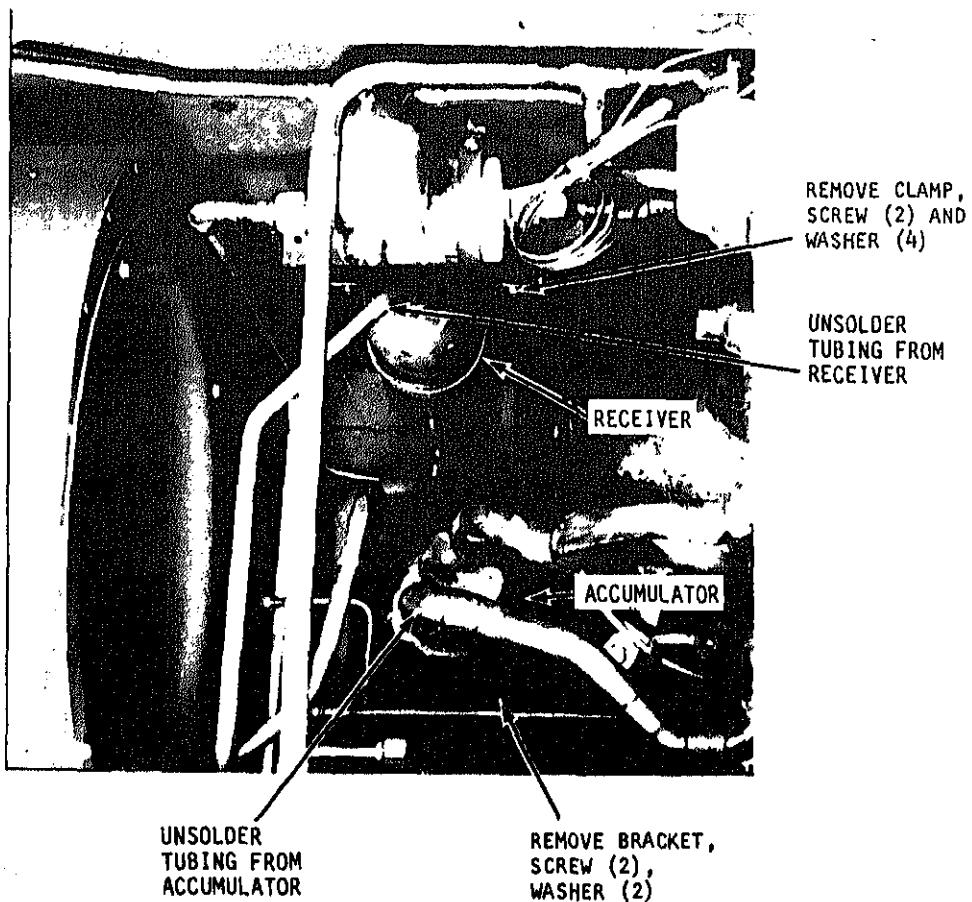


Figure 5-8. Receiver and accumulator removal and installation.

counterclockwise rotation condenser fan assembly and mounting bracket.

(4) Refer to figure 5-8 and unsolder system tubing from accumulator.

(5) Remove two screws and washers holding accumulator bracket. Remove accumulator.

(6) Remove nut to separate accumulator from bracket.

## WARNING

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.

### c. Installation

(1) Mount bracket on accumulator.

(2) Refer to figure 4-9 and install accumulator using bracket attaching hardware.

(3) Refer to paragraph 5-7 and solder system tubing to accumulator.

(4) Refer to paragraph 5-6 and leak test the refrigeration system.

(5) Refer to figure 4-9 and install condenser fan assembly and mounting bracket.

(6) Refer to figure 4-4 and install rear top cover.

(7) Refer to figure 6-1 and purge refrigerant system.

(8) Refer to figure 6-2 and charge refrigerant system.

a. General. The liquid sight indicator provides a heavy glass porous hole to give visible indication of refrigerant flow. Figure 1-2 shows the location and figure 5-9 is a closeup view.

### b. Removal.

## WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove rear top cover.

(3) Refer to figure 4-9 and remove the counterclockwise rotation condenser fan assembly and mounting bracket.

(4) Refer to figure 5-9 and remove the liquid sight indicator mounting plate.

(5) Unsolder the liquid sight indicator from the refrigerant system tubing.

### c. Installation.

(1) Refer to figure 5-9 and install the liquid sight indicator and mounting bracket.

## **WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.
2. Certain brazing operations may require mechanical ventilation.
3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.

(2) Refer to paragraph 5-6 and refer the liquid sight indicator to the refrigerant system tubing.

(3) Refer to para 5-6 and leak the refrigeration system.

(4) Refer to figure 6-1 and pu the refrigeration system.

(5) Refer to figure 4-9 and i stall the counterclockwise rotation denser fan assembly and fan mountin bracket.

(6) Refer to figure 4-4 and st all the rear top cover.

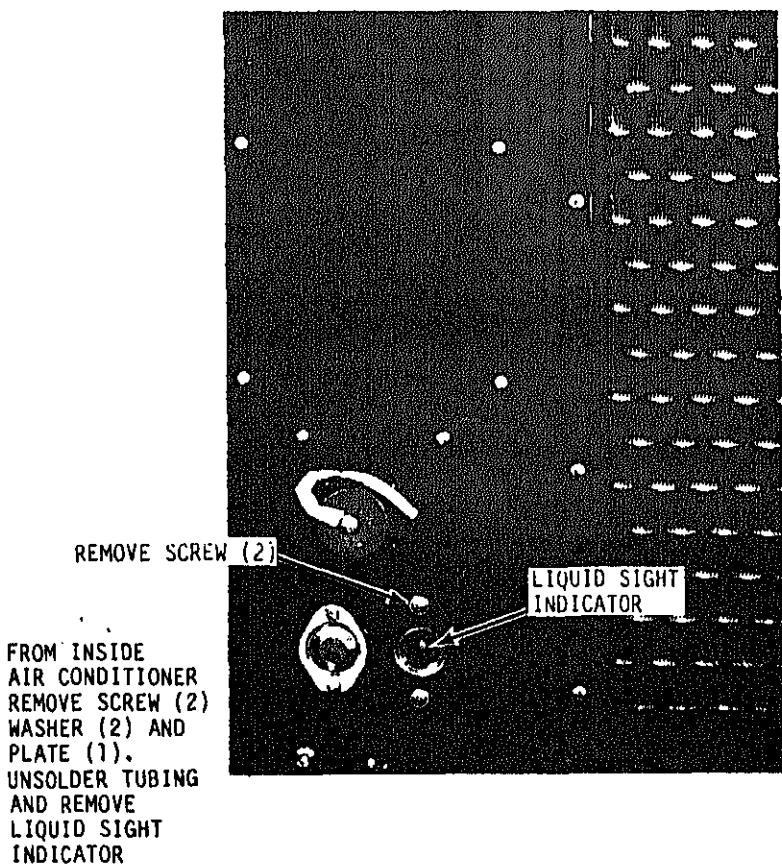


Figure 5-9. Liquid sight indicator removal and installation

## WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

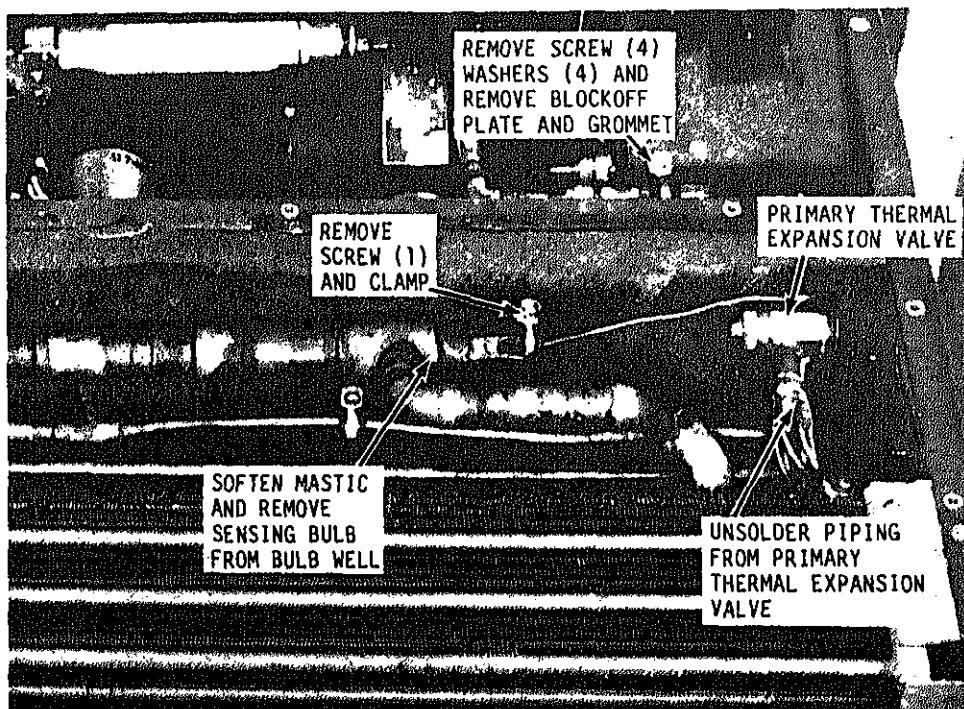
2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure

to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(7) Refer to figure 6-2 and charge the refrigerant system.

### 5-29. Primary Thermal Expansion Valve

a. General. The primary thermal expansion valve is hermetically sealed and cannot be repaired.



a. Removal.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(1) Refer to figure 6-1 and purge the refrigerant system.

(2) Refer to figure 4-4 and remove top front cover.

(3) Refer to figure 5-10. Soften mastic in the bulb well and remove expansion valve bulb. Take care to id damaging the capillary tube.

(4) Remove the expansion valve mp.

(5) Unsolder the expansion valve m the refrigerant system tubing.

c. Installation.

(1) Refer to figure 5-10 and mount expansion valve against the compartment wall using the mounting clamp.

**WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.

(2) Solder the expansion valve the refrigerant system tubing.

(3) Refer to para 5-6 and leak the refrigeration system.

(4) Insert approximately one oz of thermal mastic in bulb well. Ins sensing bulb of expansion valve and bulb back and forth to distribute mastic. Position bulb approximately inch beyond open end of bulb well.

(5) Refer to figure 6-1 and pur the refrigerant system.

(6) Refer to figure 4-4 and in stall top front cover.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(7) Refer to figure 6-2 and ch refrigerant system.

5-30. Quench Thermal Expansion Valve

a. General. The quench thermal expansion valve is hermetically sealed and cannot be repaired.

b. Removal.

## WARNING

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.
2. Personnel with a history or other evidence of cardiac

rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

NOTE: UNSOLDER JOINTS

REMOVE  
SCREW (1)  
WASHER (1)  
SPACER (1)  
CLAMP (1)

FLUID  
PRESSURE  
REGULATOR

REMOVE SCREW (1)  
WASHER (1)  
CLAMP (1)

REMOVE  
SCREW (4)  
WASHER (4)  
BLOCKOFF P  
GROMMET (1)

REMOVE  
SCREW  
WASHER  
SPACER  
CLAMP

QUENCH THERMAL  
EXPANSION VALVE

SOFTEN MASTIC.  
REMOVE BULB FROM  
BULB WELL

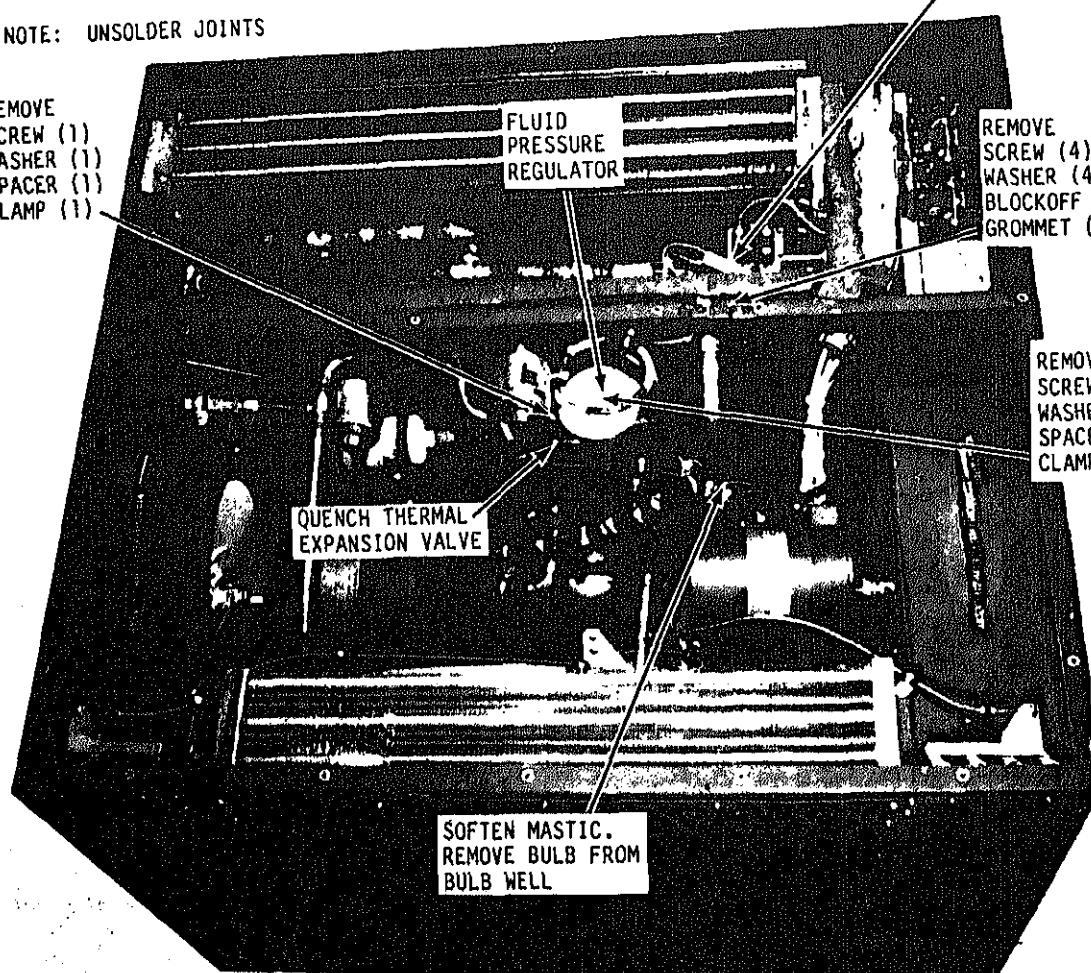


Figure 5-11. Quench thermal expansion valve and fluid pressure regulator, rem

(1) Refer to figure 6-1 and discharge the refrigerant system.

(2) Refer to figure 4-4 and remove the top rear cover.

(3) Refer to figure 5-11. Soften the mastic in the bulb well and remove the expansion valve bulb. Take care to avoid damaging the capillary tube.

(4) Remove the expansion valve clamp.

(5) Unsolder the expansion valve from the refrigerant system tubing.

c. Installation.

(1) Refer to figure 5-11 and mount the expansion valve against the compartment wall using the mounting clamp.

**WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.

(2) Solder the expansion valve to the refrigerant system tubing.

(3) Refer to para 5-6 and leak test the refrigerant system.

(4) Insert approximately one ounce of thermal mastic in bulb well. Insert sensing bulb of expansion valve and move bulb back and forth to distribute mastic. Position bulb approximately one inch beyond open end of bulb well.

(5) Refer to figure 6-1 and purge the refrigeration system.

(6) Refer to figure 4-4 and install top rear cover.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(7) Refer to figure 6-2 and refrigerant system.

5-31. Fluid Pressure Regulator V

a. General. The fluid pressure regulator valve is hermetically sealed and cannot be repaired.

b. Removal.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

charge the refrigerant system.

(2) Refer to figure 4-4 and remove the air conditioner top covers.

(3) Refer to figure 5-11 and un-clamp the regulator valve sensing bulb.

(4) Remove the regulator valve mounting clamp.

(5) Unsolder the regulator valve from the refrigerant system tubing. Remove by drawing the bulb through the compartment wall.

c. Installation.

(1) Refer to figure 5-11 and mount the fluid pressure regulator against the compartment wall using the mounting clamp.

**WARNING**

1. Brazing operations should be carried out using approved eye protection equipment and rods not containing cadmium.

2. Certain brazing operations may require mechanical ventilation.

3. Local preventive medicine personnel should be queried if doubt exists as to rod composition or ventilation requirements.

to the refrigerant system tubing.

(3) Feed the sensing bulb the compartment wall and clamp in

(4) Refer to para 5-6 and le the refrigeration system.

(5) Refer to figure 6-1 and the refrigeration system.

(6) Refer to figure 4-4 and stall the top covers.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

(7) Refer to figure 6-2 and charge the refrigerant system.

## Section I. REFRIGERATION SYSTEM

## 1. General.

The refrigerant system, illustrated in the refrigerant flow diagram (figure 1), is a mechanical, vapor cycle type circuit consisting of the evaporator, thermal expansion valve, motor-compressor, condenser, and the necessary valves and cutout devices for automatic control during operation. The thermal expansion valve releases high-pressure liquid refrigerant into the evaporator at reduced pressure. The liquid refrigerant begins to vaporize by absorbing heat from the air passing over the external surface of the evaporator coil. The heated vapor is sucked out of the evaporator section by the motor-compressor and forced into the condenser section under high pressure where it is cooled and condensed back into a liquid. The heat released during condensation is carried off by the condensing air stream. The liquid refrigerant flows from the condenser to receiver, to a subcooler, and then to the thermal expansion valve. If the temperature control switch (evaporator return air thermostat) becomes satisfied, or the evaporator return air temperature is lower than the control switch set point, the refrigerant system will switch to a bypass condition. The temperature control switch will activate the normally-open liquid bypass solenoid valve, closing the valve, and therefore cutting off the evaporator section of the unit. The motor-compressor will continue to pump as usual and the suction pressure will begin to drop. When it reaches approximately 58 psig (400 kPa), the pressure regulating valve will start to open in an effort to maintain the suction pressure above 55 psig (380 kPa) (approximately). As the suction temperature increases, due to the pressure regulating valve opening, the

quench expansion valve will start to meter liquid refrigerant into the suction line in an effort to maintain suction temperature below 75°F (24°C) (approximately), or 30°F (-1°C) superheat (approximately). This action (pressure regulator and quench valve actions) is totally automatic and also occur at extreme conditions in an attempt to maintain the suction pressure (even during the cooling mode) at a condition above 55 psig (380 kPa) and the suction temperatures (measured at the quench bulb well) below 75°F (24°C). The condenser louvers are operated by a refrigerant powered piston located in the high pressure part of the system. This piston should be fully extended (louvers open at 80°F (27°C) approximately) at 250 psig (1140 kPa) pressure and fully closed at 165 psig (1140 kPa). Failure to perform this function could result in icing of the evaporator coil and/or cutout on the pressure cutout.

## 6-2. Pressure Testing the Refrigeration System.

a. General. A pressure test will indicate whether the air conditioner is operating at normal or at abnormal pressures. When the air conditioner is operating at normal pressures, the pressures should be ascertained and corrected. Refer to table 5-1 for troubleshooting chart.

b. System Pressure Test. Remove caps from high and low pressure service valves (fig. 5-6), connect suction and discharge pressure gages to their respective service valves. Compare the gage reading with the normal range of system pressure shown in table 6-1.

Table 6-1. Normal Operating Pressures.

Outdoor Ambient Temperature				
	50°F (10°C)	75°C (24°C)	100°F (38°C)	120°F (49°C)
At 90°F (32°C) DB return air to unit				
Suction Pressure	58-65 psi (400-450 kPa)	58-70 psi (400-485 kPa)	60-75 psi (255-295 kPa)	75-90 psi (515-620 kPa)
Discharge Pressure	125-160 psi (860-1100kPa)	175-210 psi (1200-1450kPa)	255-295 psi (1750-2025kPa)	370-410 psi (2550-2825kPa)
At 80°F (27°C) DB return air to unit				
Suction Pressure	58-65 psi (400-450 kPa)	58-70 psi (400-485 kPa)	60-75 psi (415-515 kPa)	65-75 psi (450-515 kPa)
Discharge Pressure	120-155 psi (825-1070kPa)	170-205 psi (1170-1415kPa)	250-290 psi (1725-2000kPa)	370-410 psi (2550-2825kPa)

## -3. Servicing Refrigerant System.

**WARNING**

1. Caution should be exercised with fluorocarbon refrigerant gas (freons) as they can displace oxygen and thereby cause suffocation.

2. Personnel with a history or other evidence of cardiac rhythm abnormalities should be made aware of the potential for aggravation of existing cardiac rhythm abnormalities or the induction of arrhythmias, as a result of exposure to fluorocarbon refrigerant gases (freons). Such individuals should be evaluated by local medical authorities before working in environments where potential freon exposure may occur.

a. General. When the air conditioner must undergo maintenance that requires opening the system, the system must be discharged prior to maintenance, leak tested and purged, a new dehy-

b. Discharging System. Refer to figure 6-1 for instructions on discharging the refrigerant system.

c. Testing System for Leaks. Refer to paragraph 5-6 and leak test the refrigeration system.

d. Purging the Refrigerant System. Refer to figure 6-1 and purge the refrigerant system.

e. Charging the System. Refer to figure 6-2 for instructions on charging the system with refrigerant.

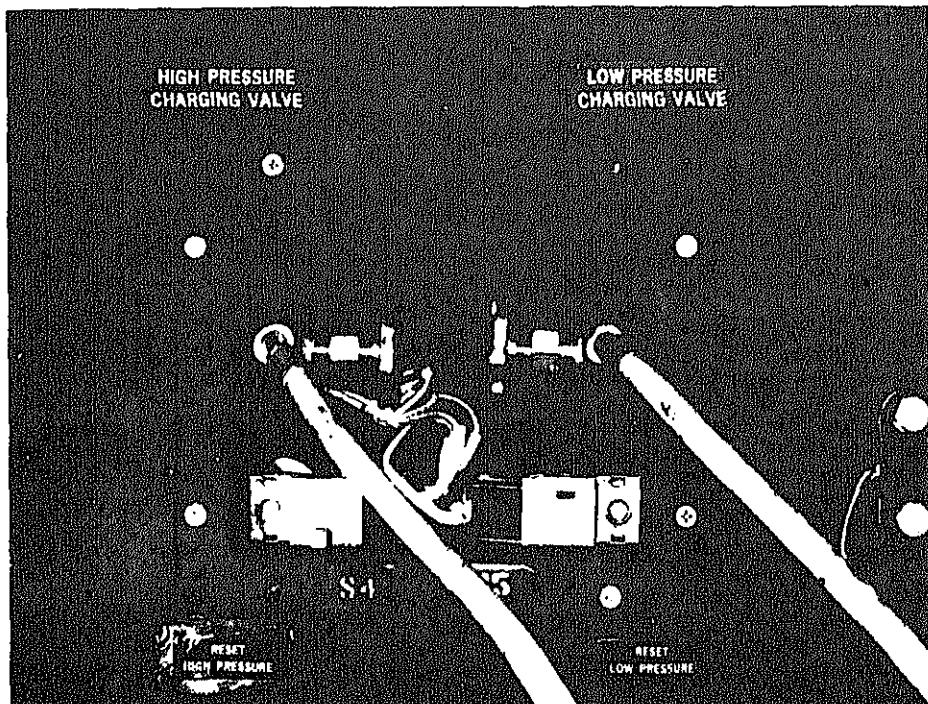
## 6-4. Repairing Refrigerant Leaks.

a. Locate leak (para 5-6).

b. Discharge system (figure 6-1), repair leak, and recharge system (para 6-3).

## NOTE

If soldering is necessary on any part of the system, a constant purge of dry nitrogen must be fed through the system being soldered to prevent scale formation within the system.



TO DISCHARGE SYSTEM:  
REMOVE ACCESS COVER.  
REMOVE LOW PRESSURE CHARGING VALVE  
CAP. ATTACH A SUITABLE HOSE TO  
CHARGING VALVE AND DISCHARGE  
REFRIGERANT INTO A SAFE AREA.

NOTE:  
TO PREVENT EXCESS LOSS OF OIL,  
DISCHARGE SYSTEM SLOWLY OVER A  
PERIOD OF TWO HOURS.

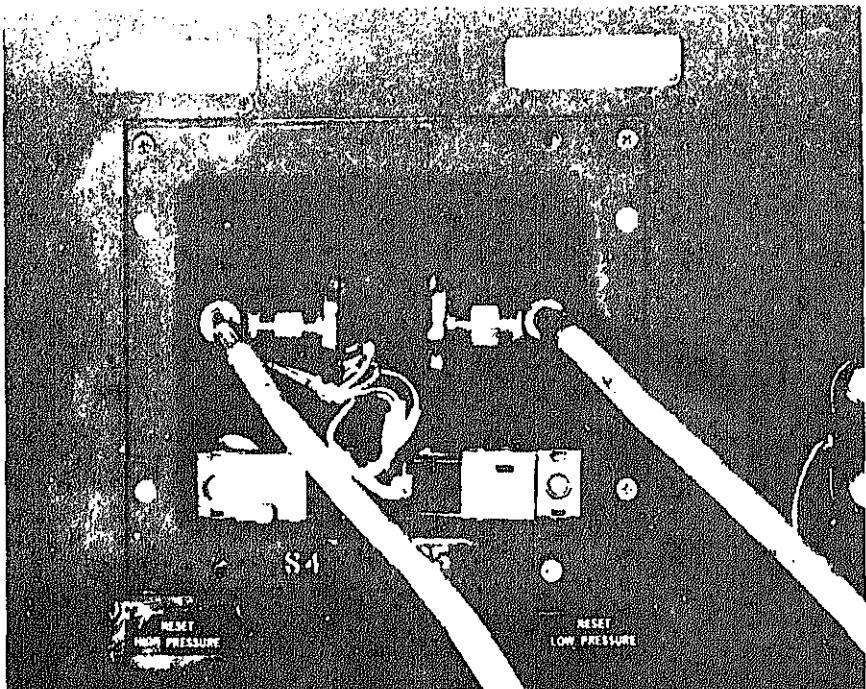
TO PURGE SYSTEM:  
REMOVE HIGH PRESSURE CHARGING VALVE CAP.  
CONNECT VALVE TO A CYLINDER OF DRY  
NITROGEN. ATTACH A SUITABLE DISCHARGE

HOSE TO LOW PRESSURE CHARGING VALVE.  
OPEN NITROGEN VALVE AND ALLOW NITROGEN  
TO FLOW THROUGH SYSTEM UNTIL ALL MOISTURE  
IS FORCED OUT. CLOSE NITROGEN CYLINDER  
VALVE.

TO EVACUATE SYSTEM:  
CONNECT A VACUUM PUMP TO HIGH AND LOW  
PRESSURE CHARGING VALVES. START  
VACUUM PUMP AND RECORD TIME FOR MAXIMUM  
VACUUM READING ON GAGE. CONTINUE  
EVACUATING FOR EQUAL PERIOD OF TIME.  
STOP PUMP AND OBSERVE GAGE. IF VACUUM  
HOLDS FOR A TIME EQUAL TO PUMP DOWN TIME  
EVACUATION IS SATISFACTORY. SEE FIGURE  
6-2 FOR CHARGING SYSTEM.

WARNING:  
AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND  
AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY  
CAREFUL THAT REFRIGERANT 22 DOES NOT COME IN  
CONTACT WITH EYES. IN CASE OF REFRIGERANT LEAKS,  
VENTILATE AREA IMMEDIATELY.

Figure 6-1 Discharging and purging refrigerant system



NOTE: STEPS 1, 2, 3 AND 4 APPLY ONLY TO A COMPLETELY EVACUATED SYSTEM. A FULLY CHARGED SYSTEM CONTAINS  $11.5 + .5$  POUNDS ( $5.23 + .23$  KG) OF REFRIGERANT 22. TO ADD REFRIGERANT TO AN INCOMPLETELY CHARGED SYSTEM, REFER TO STEP 5.

- STEP 1. REMOVE SERVICE VALVE ACCESS COVER. REMOVE VALVE CAPS AND LOOSELY CONNECT CHARGING MANIFOLD SERVICE LINES TO AIR CONDITIONER CHARGING VALVES. ATTACH LINE FROM REFRIGERANT DRUM TO MANIFOLD.
- STEP 2. OPEN REFRIGERANT DRUM VALVE AND MANIFOLD VALVES AND PURGE AIR BOTH FROM MANIFOLD AND SERVICE LINES. TIGHTEN SERVICE LINE CONNECTIONS AT CHARGING VALVES AND CLOSE LOW SIDE VALVE ON CHARGING MANIFOLD.
- STEP 3. POSITION REFRIGERANT DRUM UPSIDE DOWN ON A SCALE. OPEN AIR CONDITIONER HIGH PRESSURE CHARGING VALVE AND CHARGE SYSTEM UNTIL SCALE INDICATES A FULL CHARGE, THEN CLOSE BOTH HIGH PRESSURE CHARGING VALVE AND DRUM VALVE. DISCONNECT CHARGING LINES UNLESS, DUE TO PRESSURE EQUALIZATION IN DRUM AND AIR CONDITIONER SYSTEM, A FULL CHARGE IS NOT MEASURED, THEN PROCEED TO STEP 4.

Figure 6-2. Charging refrigerant system (Sheet 1 of 2)

usually due to a mechanical failure or motor burnout. If the compressor is mechanically frozen or sustains a motor burnout, it must be replaced. A compressor failure generates high temperature causing a breakdown of oil, refrigerant and motor insulation, with the resulting formation of acid, moisture, and sludge. These products are extremely corrosive and must be flushed from the system or repeated burnouts will occur.

b. Procedure.

(1) Discharge system and purge with nitrogen (figure 6-1).

(2) Remove defective motor-compressor (figure 5-2).

(3) Remove dehydrator (figure 5-7).

(4) With compressor out of system, purge all lines with dry nitrogen.

(5) Install a new compressor (figure 5-2) containing a full and proper oil charge.

5-7). In step (10) this dehydrator again be replaced.

(7) Triple evacuate system a charge with refrigerant R22.

(8) Start air conditioner (f 2-5) and operate unit for 24 hour

(9) Discharge system and purge nitrogen (figure 6-1).

(10) Install new dehydrator (5-7).

(11) Evacuate system and recharge with refrigerant (figure 6-2).

(12) Operate air conditioner.

6-6. Evaporator and Condenser Co

a. Inspection. Inspect coils damaged tubing and bent fins. Inspect threaded holes for damaged or stripped threads.

STEP 4. POSITION REFRIGERANT DRUM UPRIGHT ON SCALE WITH LINES CONNECTED FOR GAS CHARGING. IF THE WEIGHT OR REFRIGERANT TO FULLY CHARGE THE SYSTEM IS KNOWN, OPERATE AIR CONDITIONER WITH CONTROLS SET FOR MAXIMUM COOLING. OPEN REFRIGERANT DRUM VALVE, LOW PRESSURE CHARGING VALVE, AND LOW SIDE MANIFOLD VALVE. CONTINUE OPERATION UNTIL THE SYSTEM IS FULLY CHARGED, THEN CLOSE VALVES. STOP AIR CONDITIONER OPERATION AND DISCONNECT CHARGING LINES.

STEP 5. TO ADD REFRIGERANT TO SYSTEM WITH LOW CHARGE AS INDICATED BY BUBBLES IN LIQUID SIGHT INDICATOR:  
WITH REFRIGERANT DRUM UPRIGHT, CONNECT LINES FOR GAS CHARGING THROUGH LOW SIDE MANIFOLD VALVE. PURGE CHARGING LINES BY LOOSELY CONNECTING LINE AT DRUM VALVE AND SLIGHTLY OPENING AIR CONDITIONER CHARGING VALVES. TIGHTEN LINE AT DRUM VALVE. OPERATE AIR CONDITIONER WITH CONTROLS SET FOR MAXIMUM COOLING. OPEN REFRIGERANT DRUM VALVE, LOW SIDE MANIFOLD VALVE, AND LOW PRESSURE CHARGING VALVE ON AIR CONDITIONER. CONTINUE OPERATION UNTIL BUBBLES NO LONGER APPEAR IN SIGHT INDICATOR. THEN CLOSE LOW PRESSURE CHARGING VALVE ON AIR CONDITIONER. REPEAT CHARGING IF BUBBLES REAPPEAR IN SIGHT INDICATOR. WHEN BUBBLES DO NOT REAPPEAR AFTER 15 MINUTES OF OPERATION, THE SYSTEM IS FULLY CHARGED. CLOSE CHARGING VALVES AND DISCONNECT LINES.

Figure 6-2. Charging refrigerant system (Sheet 2 of 2)

b. Repair. Repair any leaks. Straighten bent fins. Repair or replace damaged tubing if possible. Replace coil if repair is not practical.

#### 6-7. Solenoid Valve.

a. General. Replaceable parts are the coil bonnet assembly, diaphragm and the preformed packing. See figure 6-3.

b. Coil Replacement. Replace coil as follows:

(1) Remove electrical connector from solenoid valve leads.

(2) Remove nut on top of valve housing. Lifting housing and coil assembly from bonnet assembly.

(3) Remove coil from housing.

(4) Install coil bottom plate edge upward.

(5) Install lower coil sleeve flange at bottom. Install coil wire lead exits at bottom.

(6) Install coil spring with edges upward and upper coil sleeve

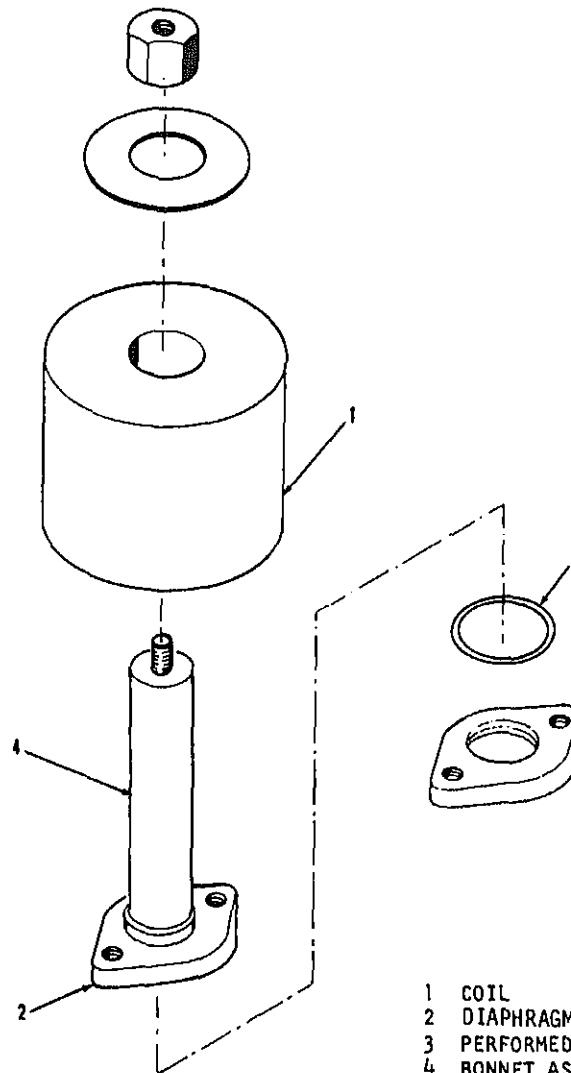


Figure 6-3. Solenoid valve, exploded view

the coil spring.

(7) Install coil housing, data plate, and nut.

#### 6-8. Fan Motors.

a. General. Except for the shaft on the rotor, the condenser fan motors and the evaporator fan motor are identical, therefore, the following instructions apply equally to either motor.

b. Disassembly. Refer to figure 6-4 and disassemble motor as follows:

move end bell (1).

(2) Remove end bell bearing.

(3) Remove rotor (4).

(4) Remove four screws (5) move end bell (6) from stator (7).

(5) Remove screw (8) and (9). Remove screws (10) and re-cable (11) from motor.

(6) Remove bearing (12) and (13) from end bell (6).

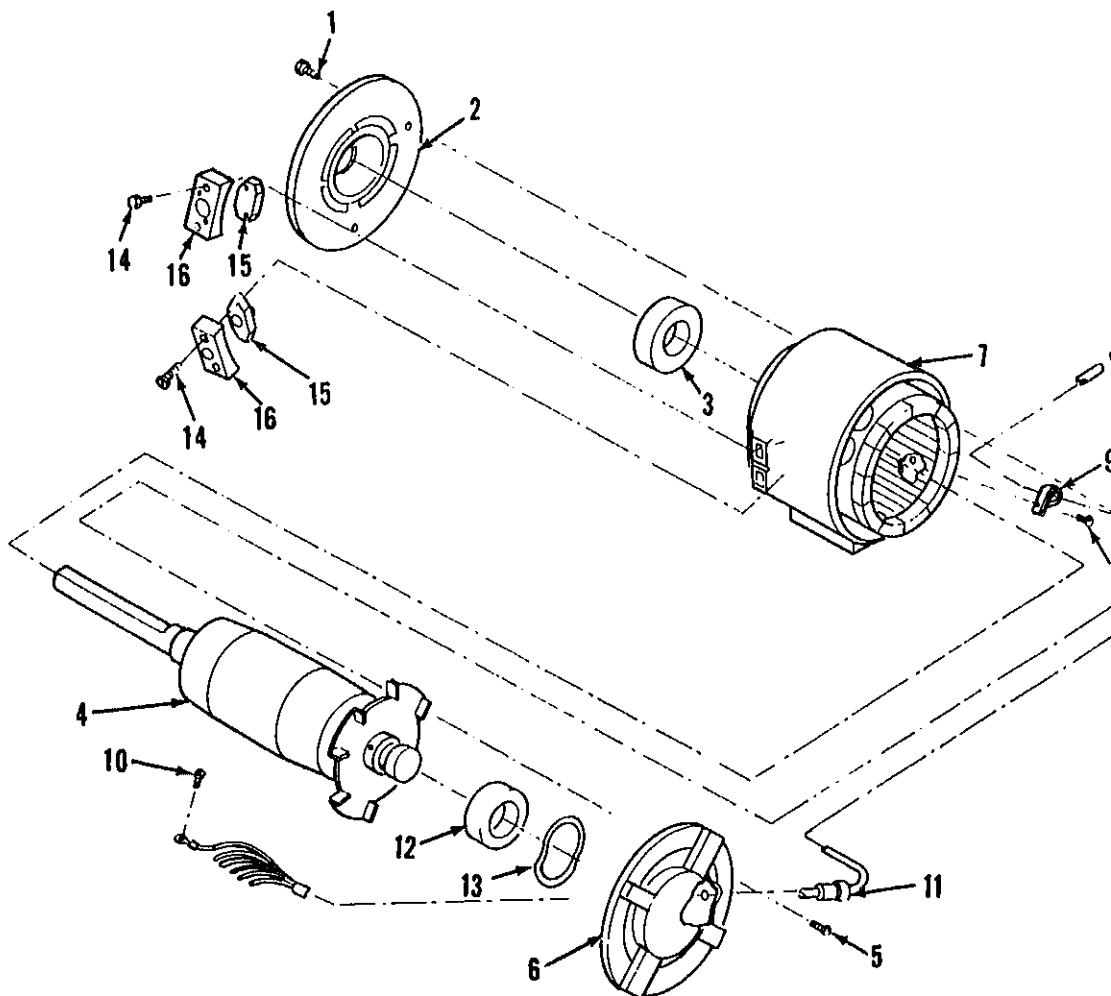


Figure 6-4. Fan motor exploded view

and remove screws (14), thermal protectors (15) and housing (16).

c. Cleaning, Inspection and Repair.  
Clean, inspect and repair parts as follows:

## WARNING

Dry cleaning solvent, P-D-680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

(1) Clean metal parts with cleaning solvent (Fed. Spec. P-D-680). Wipe off electrical parts with a clean cloth.

(2) Inspect wiring for damaged insulation and broken wiring. Repair damaged insulation.

(3) Inspect connector for damage.

(4) Inspect bearing for wear, galling or flat spots. Replace defective bearings.

worn bearing surface. Repair minor effects.

(6) Inspect stator for damaged, broken or shorted wiring.

d. Assembly. Refer to figure 6- and assemble motor as follows:

(1) Install thermal protectors (15), housing (16), and screws (14), described in paragraph 4-20 and 4-22.

(2) Install spacer (13) and bearing (12) in end bell (6).

(3) Install cable ends using screw (10).

(4) Attach end bell (6) to stator (7) with screws (5).

(5) Attach cable (11) to stator with clamp (9) and screws (8).

(6) Install rotor (4) in motor.

(7) Install bearing (3) in end bell (2).

(8) Attach end bell (2) with screw (1).

## REFERENCES

Fire Protection.

TB 5-4200-200-10 Hand Portable Fire Extinguisher for Army Users

Lubrication.

C9100IL Fuels, Lubricants, Oils and Waxes

Painting.

TM 9-213 Painting Instructions for Field Use

Maintenance.

TM 5-4120-361-24P Organizational, Direct and General Support Maintenance Repair Parts and Special Tool List for Air Conditioner Horizontal, Compact, 36,000 BTUH

TM 38-750 Army Maintenance Management System

TM 750-244-3 Procedures for Destruction of Equipment to Prevent Enemy Use

Fed. Spec. P-D-680 Dry Cleaning Solvent

Shipment and Storage.

TM 740-90-1 Administration Storage of Equipment



## General.

This Component of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the air conditioner and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the air conditioner in operation, to operate it, and perform emergency repairs. Although shipped separately packed, they must accompany the air conditioner during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hardware identification items. This manual is your authority to requisition replacement parts, based on TOE/MTOE authorization of the end item.

## Explanation of Columns.

a. Illustration. This column is provided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

istics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of a major item before moving on to an adjacent area.

f. Usable on Code. "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of codes in these lists are:

Code	Used On
DBK	Model CH436-1
DBJ	Model CH636-1

g. Quantity Required (Qty Req). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is blank for use during an inventory. Under the Recv'd column, list the quantity you actually receive on your major item. The Date columns are for you when you inventory the major item at a later date; such as for shipment to another site.

(1) Illustration	(2)	(3)	(4)	(5)	(6)	(7)	(8) Quantity		
(a) Figure No.	(b) National Stock No.	Part No.	Description	Location On	Usable On	Qty Reqd	Rec'd Date	Date	Due
Section II. INTEGRAL COMPONENTS OF END ITEM									

NONE

Section III.  
BASIC ISSUE ITEMS

Connector	DBJ/DBK	1
TM5-4120-361-14	Technical Manual	DBJ/DBK
TM5-4120-361-24P	Technical Manual	DBJ/DBK
Installation parts consisting of:	DBJ/DBK	
13216E6137	Mount, Resilient	2
13216E6153	Tube, Elastomeric	1
13216E6152	Spacer	1
13216E6138-2	Washer	1
MS90726-65	Screw	1

## ADDITIONAL AUTHORIZATION LIST

## Section I. INTRODUCTION

ope.

This appendix lists additional items you are authorized for the support of the air conditioner.

neral.

This list identifies items that do have to accompany the air conditioner that do not have to be turned in t. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

planation of Listing.

National stock numbers, descriptions and quantities are provided to you identify and request the additional items you require to support this

equipment. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column. These codes are identified as:

Code	Used On
DBK	Model CH436-1
DBJ	Model CH636-1

(1) (2) (3) (4)

DESCRIPTION			
NATIONAL STOCK NUMBER	PART NUMBER & FSCM	USABLE ON CODE	U/M QT AUT
			NONE



## APPENDIX D

### MAINTENANCE ALLOCATION CHART

#### Section I. Introduction

a. General.

b. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

c. The Maintenance Allocation Chart (C) in Section II designates overall responsibility for the performance of maintenance functions on the identified item or component. The implementation of the maintenance functions upon end item or component will be consistent with the assigned maintenance actions.

d. Section III lists the special tools and test equipment required for each maintenance function as referenced in Section II.

e. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

#### f. Maintenance Functions.

f. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

g. Test. To verify serviceability detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing these characteristics with prescribed standards.

h. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to fill, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

i. Adjust. To maintain, within prescribed limits, by bringing into proper exact position, or by setting the operating characteristics to specified parameters.

j. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

k. Calibrate. To determine and correct corrections to be made or to be adjustment on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in accuracy of the instrument being compared.

l. Install. The act of emplacing seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

m. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

n. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

o. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

p. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel

maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

D-3. Column Entries Used in the MAC.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate sub-column(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of man-hours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition. The symbol designations for the various maintenance levels are as follows:

C. . . . . Operator or crew

O. . . . . Organization maintenance

F. . . . . Direct support mainten

H. . . . . General support mainte

D. . . . . Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, the common tool sets (not individual tools) and special tools, test, and support equipment required to perform the desired function.

f. Column 6, Remarks. This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section II.

D-4. Column Entries Used in Tool Test Equipment Requirements.

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates a maintenance function on the identified item or component.

b. Column 2, Maintenance Level. Lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

D-5. Explanation of Columns in Section IV.

a. Reference Code. The code is recorded in column 6, Section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed as indicated on the MAC, Section II.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment
			C	O	F	H	D	
01	Air Conditioner	Inspect Service Install	.10 .20				.75	
	Top Covers and Front Louvers							
	Metal Covers	Inspect Service Repair Replace	.10 .10				.25 .20	
	Cover Gaskets	Inspect Replace	.10				.25	
	Cover Insulation	Inspect Replace					.10 .25	
	Information Plates	Inspect Service Replace					.10 .10 .25	
	Front Louvers	Inspect Service Adjust Replace					.10 .10 .10 .20	
	Air Conditioning Filter	Inspect Service Replace					.10 .40 .20	
02	Condenser Guard, Covers, Ventilation Air Filter, & Lifting Ring							
	Condenser Guard	Inspect Service Replace					.10 .10 .20	

- SUBCOLUMNS ARE AS FOLLOWS: C - OPERATOR/CREW  
F - DIRECT SUPPORT H - GENERAL SUPPORT
- O - ORGANIZATIONAL  
D - DEPOT
- INDICATES WT/MH REQUIRED.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment
			C	O	F	H	D	
03	Condenser Fans & Motor Support Assembly	Fabric Cover	Inspect	.10				
			Service	.10				
			Repair		.10			
			Replace		.20			
		Ventilation Air Filter	Inspect	.10				
			Service		.35			
			Replace		.30			
		Lifting Ring & Clip	Inspect		.10			
			Replace				1.0	
		Axial Fans	Inspect		.10			
04	Condenser Fan Motor		Service		.15			
			Align		.25			
			Replace		2.0			
		Motor Supports	Inspect			2.0		
			Replace			3.0		
05	Evaporator Impeller, Housing and Related Parts	Condenser Fan Motor	Inspect		.10			
			Service		.15			
			Test		1.0			
			Repair				4.0	
			Replace				2.0	
	Impeller	Evaporator Impeller, Housing and Related Parts	Inspect		.10			
			Service		.15			
			Align		.25			
			Replace		2.0			

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O - ORGANIZATIONAL  
 D - DEPOT

.. INDICATES WT/MH REQUIRED.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment
			C	O	F	H	D	
	Housing & Mounting Base Assemblies	Inspect Replace		.10 2.0				
06	Evaporator Motor	Inspect Service Test Repair Replace		.10 .15 1.0 4.0 1.5				
07	Ventilation Damper and Actuator	Inspect Service Adjust Replace		.10 .20 .50 1.0				
08	Condenser Louver Actuator & Control Assembly							
	Louver Control Cables	Inspect Service Adjust Replace		.15 .25 .35 .50				
	Cable Actuator	Inspect Replace		.15 8.0				
09	Refrigerant Valves and Related Tubing							
	Expansion Valves	Inspect Test Replace		.15 .50 4.0				
	Solenoid Valves	Inspect Test Replace		.15 .25 4.0				
	Pressure Regulating Valve	Inspect Test Replace		.15 .50 4.0				

\* SUBCOLUMNS ARE AS FOLLOWS: C - OPERATOR/CREW  
 F - DIRECT SUPPORT H - GENERAL SUPPORT

O - ORGANIZATIONAL  
 D - DEPOT

.. INDICATES WT/MH REQUIRED.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment
			C	O	F	H	D	
10	Tubing & Fittings	Inspect Replace		.10				
	Dehydrator & Related Tubing			4.0				
	Dehydrator	Inspect Replace		.10				
11	Tubing & Fittings	Inspect Replace		.10				
	Pressure Switches, Liquid Receiver, Sight Indicator, Charging Valves & Related Tubing			4.0				
	Receiver	Inspect Replace		.50				
	Sight Indicator	Inspect Service Replace	.05	.05			12.0	
	Charging Valves	Inspect Replace		.10				
	Tubing & Fittings	Inspect Replace		4.0				
	Pressure Switches	Inspect Test Replace		.10				
12	Compressor, Accumulator, & Related Parts			.25				
	Compressor	Inspect Test Replace		4.0				
				.10				
				.15				
							12.0	

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 F - DIRECT SUPPORT H - GENERAL SUPPORT O - ORGANIZATIONAL  
 D - DEPOT  
 . . INDICATES WT/MH REQUIRED.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment	Re
			C	O	F	H	D		
13	Accumulator	Inspect Service Replace	.10 .10				12.0		
	Evaporator & Con- denser Coils & Related Compartment Parts								
	Mist Eliminator	Inspect Service Replace	.10 .50 .10						
	Coils	Inspect Service Replace	.10 .15				8.0		
	Tubing & Fittings	Inspect Replace	.10 4.0						
	Compartment Insulation	Inspect Service Replace	.10 .15				2.0		
14	Junction Box & Control Module Assy	Inspect Service Replace	.10 .25 .10						
	Control Module Electrical Components	Inspect Service Test Replace	.10 .25 .50 1.0						
	Junction Box Electrical Components	Inspect Service Test Replace	.10 .25 .30 1.0						
15	Wiring Harness	Inspect Test Repair Replace	.25 .40 1.0 8.0						

SUBCOLUMNS ARE AS FOLLOWS: C - OPERATOR/CREW  
 F - DIRECT SUPPORT H - GENERAL SUPPORT  
 . INDICATES WT/MH REQUIRED.

O - ORGANIZATIONAL  
 D - DEPOT

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment
			C	O	F	H	D	
16	Ambient Thermostat, Auxiliary Power Inlet, and Con- densate Drain Assembly							
	Ambient Thermostat Switch Assembly	Inspect Test Replace		.10 .50 8.0				
	Inlet Pwr Connector Assy	Inspect Repair Replace		.10 8.0 8.0				
17	Heater, Trans- former, Rectifier and Related Parts							
	Heater Element	Inspect Test Replace		.10 .25 1.0				
	Thermostatic Switch	Inspect Test Replace		.10 .25 .50				
	Rectifier	Inspect Test Replace		.10 .25 .50				
	Transformer	Inspect Test Replace		.10 .50 1.0				
	Capacitor	Inspect Test Replace		.10 .25 .25				

• SUBCOLOUMNS ARE AS FOLLOWS: C - OPERATOR/CREW  
 F - DIRECT SUPPORT H - GENERAL SUPPORT

O - ORGANIZATIONAL  
 D - DEPOT

.. INDICATES WT/MH REQUIRED.

## 36,000 BTU/HR Air Conditioner, Compact, Horizontal

(1) Group Num- ber	(2) Component/Assembly	(3) Maintenance Functions	(4) Maintenance Level					(5) Tools & Equipment	R
			C	O	F	H	D		
18	Louver & Condenser Fan Housing Assy								
	Louver Assy	Inspect Service Adjust Repair Replace		.15 .25 .50 1.0					
	Fan Housing	Inspect Service Replace		.10 .25 2.0					
19	Housing Assembly								
	Housing	Repair Replace					1.0 24.0		

- SUBCOLUMNS ARE AS FOLLOWS: C - OPERATOR/CREW                    O - ORGANIZATIONAL
- F - DIRECT SUPPORT    H - GENERAL SUPPORT                            D - DEPOT
- .. INDICATES WT/MH REQUIRED.

## REQUIREMENTS

(1) fer- ce de	(2) Main- te- nance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Numbe
		<p>No special tools &amp; test equipment required. Standard tools and test equipment contained in the following tool kits are adequate to accomplish the maintenance functions listed in Section II:</p> <p>Tool Kit, Service, Refrigeration Unit (SC 5180-90-CL-N18)</p> <p>Soldering Gun Kit</p>	<p>5180-00-597-1474</p> <p>3439-00-930-1638</p>	

## Section IV. MAINTENANCE ALLOCATION CHART

REFERENCE  
CODE

REMARKS

No supplemental instructions or explanatory remarks for a particular maintenance function listed in Section II are required. All functions are sufficiently defined in Section I. Due to various methods of installing the air conditioner, all active time listed for maintenance tasks are with the air conditioner at the off-equipment position at organizational level or in a repair shop facility.

**REPAIR PARTS AND SPECIAL TOOLS LIST**

**See TM 5-4120-361-24P**



# EXPENDABLE SUPPLIES AND MATERIALS LIST

## Section I. INTRODUCTION

### 1. Scope.

This appendix lists expendable supplies and materials you will need to operate and maintain the air conditioner. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

### 2. Explanation of Columns.

a. Column 1 - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

O - Organizational Maintenance

F - Direct Support Maintenance

c. Column 3 - National Stock Number. This is the National stock number assigned to the item; use it to requisition the item.

d. Column 4 - Description. Describes the Federal item name and required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance. This measure is expressed in two-character alphabetical abbreviations (e.g. ea, in, pr). If the unit of measure differs from the unit of requisition the lowest unit of measure that will satisfy your requirements.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION
1	O	4130-00-860-0042	Dust Collecting Adhesive
2	F	6830-00-106-1659	R-22 (monochlorodifluoromethane, CHClF <sub>2</sub> )



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THEN...JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, TEAR IT OUT, FOLD  
IT AND DROP IT IN THE  
MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)  
**PFC JOHN DOE**  
**COA, 3<sup>rd</sup> ENGINEER BN**  
**FT. LEONARD WOOD MO 63110**

DATE

PUBLICATION NUMBER

TM 5-412C-361-14

DATE

30 MAY 80

TITLE

air conditioner, horizontal  
compact, 36,000 BTU-H

E EXACT...PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
----------	------------	------------	-----------

IN THIS SPACE TELL WHAT IS WRONG  
AND WHAT SHOULD BE DONE ABOUT IT:

6 2-1  
a

In line 6 of paragraph 2-1a  
manual states the engine has  
cylinders. The engine on my  
only has 4 cylinders. Change  
the manual to show 4 cylinder

31 4-3

Callout 16 on figure 4-3 is pointed  
at a bolt. In the key to  
fig. 4-3, item 16 is called a  
shim. Please correct one or the  
other.

75 line 20

I ordered a gasket, item 19 on  
figure B-16 by NSN 2910-00-762-3000.  
I got a gasket but it doesn't fit.  
Supply says I got what I ordered,  
so the NSN is wrong.  
Please give me a good NSN.

NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE:

John Doe

FILL IN YOUR  
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AL  
DEPARTMENT

000-3

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$300

Commander  
US Army Troop Support and Aviation  
Materiel Readiness Command  
ATTN: DRSTS-MTPS  
4300 Goodfellow Boulevard  
St. Louis, MO 63120

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THEN...JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, TEAR IT OUT, FOLD  
IT AND DROP IT IN THE  
MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

LOCATION NUMBER

M 5-4120-361-14

DATE

30 MAY 80

TITLE

Air Conditioner, Horizontal  
Compact, 36,000 BTUH

EXACT...PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG  
AND WHAT SHOULD BE DONE ABOUT IT:

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PARTMENT OF THE ARMY

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DEPARTMENT OF THE  
ODD-914

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$500

Commander:  
U.S. Army Support and Aviation  
Material Readiness Command  
ATTN: DRSTS-MTPS  
4300 Goodfellow Boulevard  
St. Louis, Mo. 63120

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FORM, TEAR IT OUT, FOLD  
IT AND DROP IT IN THE  
MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

LICATION NUMBER

TM 5-4120-361-14

DATE

30 MAY 80

TITLE

Air Conditioner, Horizontal  
Compact, 36,000 BTUH

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AND WHAT SHOULD BE DONE ABOUT IT:

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FILL IN YOUR  
UNIT'S ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE A  
DEPARTMENT  
DOD-3

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$500

Commander:  
U.S. Army Support and Aviation  
Material Readiness Command  
ATTN: DRSTS-MTPS  
4300 Goodfellow Boulevard  
St. Louis, Mo. 63120

FOLD BACK



THEN...JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, TEAR IT OUT, FOLD  
IT AND DROP IT IN THE  
MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

DATE

PUBLICATION NUMBER

TM 5-4120-361-14

DATE

30 MAY 80

TITLE

Air Conditioner, Ho  
Compact, 36,000 BTU

BE EXACT...PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG  
AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

FILL IN YOUR  
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

POSTAGE AN  
DEPARTMENT

DDO-31

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE, \$500

Commander:  
U.S. Army Support and Aviation  
Material Readiness Command  
ATTN: DRSTS-MTPS  
4300 Goodfellow Boulevard  
St. Louis, Mo. 63120

FOLD BACK

= 10 millimeters = .39 inch  
 = 10 centimeters = 3.94 inches  
 0 decimeters = 39.37 inches  
 = 10 meters = 32.8 feet  
 = 10 dekameters = 328.08 feet  
 = 10 hectometers = 3,280.8 feet

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

**Weights**

= 10 milligrams = .16 grain  
 = 10 centigrams = 1.54 grains  
 0 decigram = .035 ounce  
 = 10 grams = .35 ounce  
 = 10 dekagrams = 3.52 ounces  
 = 10 hectograms = 2.2 pounds  
 100 kilograms = 220.46 pounds  
 = 10 quintals = 1.1 short tons

**Square Measure**

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 ac  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

**Cubic Measure**

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.81 cu. feet

**Approximate Conversion Factors**

To	Multiply by	To change	To	Mul
centimeters	2.640	ounce-inches	newton-meters	
meters	.305	centimeters	inches	
meters	.914	meters	feet	
kilometers	1.609	meters	yards	
square centimeters	6.461	kilometers	miles	
square meters	.093	square centimeters	square inches	
square meters	.836	square meters	square feet	
square kilometers	2.590	square meters	square yards	
square hectometers	.405	square kilometers	square miles	
cubic meters	.028	square hectometers	acres	
cubic meters	.765	cubic meters	cubic feet	
milliliters	29.573	cubic meters	cubic yards	
liters	.473	milliliters	fluid ounces	
liters	.946	liters	pints	
liters	3.785	liters	quarts	
grams	28.349	liters	gallons	
kilograms	.454	grams	ounces	
metric tons	.907	kilograms	pounds	
newton-meters	1.365	metric tons	short tons	
newton-meters	.11375			

**Temperature (Exact)**

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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